CLIMATOLOGICAL REFERENCE STATION
SASKATOON
ANNUAL SUMMARY
2008

C. Beaulieu
V. Wittrock
Saskatchewan Research Council
Environment and Forestry Division

SRC Publication No. 10440 - 1E09

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SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION SPONSORS, 2008

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Autumn at Innovation Place
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TABLE OF CONTENTS

Acknowledgements ... 2
Climate Reference Station sponsors, 2008 ... 2
Table of Contents ... 3
Climate Reference Station History ... 4
What is the Climate Reference Station? ... 5
Activities associated with the Climate Reference Station, 2008 ... 6
Summaries for 2008
Overview ... 7
Temperature
Daily temperature record for 2008 graph ... 8
2008 temperature records table ... 9
Dates and duration of the frost-free season table ... 9
Hourly annual temperature, box graph ... 9
Extreme temperatures for 2008 table ... 9
Temperature rankings, annual and seasonal table ... 10
Frost-free season duration and end points graph ... 12
Monthly temperatures, normals, and extremes for 2008 table ... 13
Monthly and annual temperatures graphs ... 13
Seasonal temperatures graphs ... 14
Annual days with temperatures greater than a set point graph ... 15
Annual days with temperatures less than a set point graph ... 16
Annual days with temperatures greater than 0°C (thaw days) graph ... 17
Potential Evapotranspiration (PE) using the Thornthwaite Method graph and table ... 17
Degree-days, normals and cumulative for 2008 table ... 18
Growing degree-days, annual and monthly graphs ... 18
Heating degree-days, annual and monthly graphs ... 19
Cooling degree-days, annual and monthly graphs ... 20
Extreme cooling degree-days, annual graph ... 20
Precipitation
Daily precipitation record for 2008 graph ... 21
Precipitation rankings, annual and seasonal, by driest year and least frequency tables ... 22
Precipitation rankings by dry spells/days table ... 23
Monthly ranking by driest month for 2008 table ... 23
2008 precipitation and extreme records tables ... 23
Monthly precipitation, normals and extremes for 2008 table ... 24
Monthly and annual precipitation graph ... 24
Seasonal precipitation graph ... 25
Annual and seasonal precipitation days graph ... 25
Annual Snow-on-the-Ground precipitation for October - March ... 26
Radiation
Sunrise/Sunset tables for Saskatoon, 2008 & 2009 ... 27
Bright sunshine rankings table ... 28
Monthly bright sunshine, normals and days table ... 29
Daily global and diffuse values table ... 29
Annual, seasonal and monthly bright sunshine graphs ... 30
Annual, and seasonal bright sunshine days graphs ... 31
Monthly bright sunshine, global and diffuse radiation graph ... 31
Wind
Extreme daily winds for 2008 table ... 32
Windchill calculation table ... 32
Daily windchill values for 2008 table ... 32
Monthly average and highest instantaneous wind speed table ... 33
Wind roses for 2008 ... 33
Soil Temperatures
Monthly average and normal soil temperatures at 0900hrs and 1600hrs table ... 34
Monthly average and normal soil temperatures at 0900hrs and 1600hrs graphs ... 34
Annual weather summary of elements ... 35
Monthly weather summaries of elements ... 36
Instruments used at Saskatoon SRC CRS and Glossary of Terms ... 48
References and Bibliography ... 51

CLIMATE REFERENCE STATION HISTORY

Meteorological observations at or near Saskatoon were first taken by the Royal Northwest Mounted Police in 1889 with the recording of temperature. There is some disagreement in the early records as to the exact location of the weather observing point, but the majority of the evidence indicates 52°15'N, 106°20'W, elevation 480m above sea level as the most probable location. This would place it at Clark's Crossing on the South Saskatchewan River, approximately 16 km northeast of the centre of the City of Saskatoon. At that time, there was a settlement at Clark's Crossing as well as 10 to 15 families on either side of the river where Saskatoon is now located.

Little is known about the very early observers; however, the records do show that Major T.H. Keenan took observations from March 1892 until March 1895, and Mr. George Will was the observer from January 1897 until April 1897. It is thought that T. H. Copeland was involved in the observational programme from 1895 to May 1, 1901, at which time it was taken over by Mr. Eby, Sr. Mr. Eby, Sr. recorded the observations until his death in 1921, at which time his daughter, Miss E.S. Eby, continued to record the observations. Her brother, Mr. J.M. Eby, recorded the observations beginning in April 1931 until the station was closed October 31, 1942. The Eby station recorded temperature, precipitation and weather notes on fog, thunderstorms, winds and any unusual weather phenomena. Reports were made twice daily, morning and evening.

In 1916, a climatological station was established by the Physics Department of the University of Saskatchewan and continuous observations were kept twice daily until January 15, 1965. The longtime observer was Mr. Sidney Cox. The Saskatchewan Research Council took over the programme in the fall of 1963 at the newly established Climatological Reference Station at latitude 52°09'N, longitude 106°36'W and elevation 497 m asl[1]. The first observer was Terry Beck followed three years later by Orville Olm.[2] In 1967, Joe Calvert became the primary observer until his retirement in 1983. Ray Begrand succeeded Mr. Calvert until 1988 when Virginia Wittrock became the primary observer. Since 1992, the primary observer has been Carol Beaulieu assisted by Virginia Wittrock.

In the summer of 1992, the CRS began to be converted to an automated system of data collection with the installation of a Campbell Scientific data logger and automatic sensors. Elements presently recorded at the site are temperature, precipitation, wind, solar radiation, relative humidity, barometric pressure, soil temperature and snow-on-the-ground (manual recordings). Temperature, precipitation and bright sunshine data are submitted to Environment Canada.

[1]Christiansen 1970, Environment Canada 1975, [2]Olm 2001

Mr. James Eby was one of the original members of the Temperence Colony Society. He filed his homestead in 1882 and returned with his family in 1883. He was the first president of the school board and served as the township supervisor for Nutana. While riding a horse in 1890, he was struck by lightning and was a partial invalid thereafter. In 1901, he and his daughter moved to Nutana and James served as a Federal Meteorologist for the next 20 years until his death in 1921 at the age of 77. He was buried next to his wife in the Nutana pioneer cemetery.[1]

[1]Ladd 2008

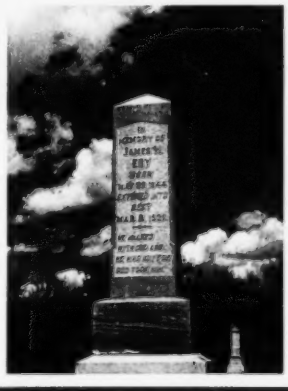


photo credit: CR Beaulieu

WHAT IS THE CLIMATE REFERENCE STATION?

The Saskatchewan Research Council's Climate Reference Station (SRC CRS) at Saskatoon is classified as a principal climatological station with supplementary climatological observations.[1] A reference climatological station's data are intended for the purpose of determining climatic trends. This requires long periods (not less than thirty years) of homogeneous records, where man-made environmental changes have been or are expected to remain at a minimum. Ideally the records should be of sufficient length to enable the identification of secular changes of climate[2]. At our station, hourly readings are taken of elements which include temperature, precipitation amount, humidity, wind, and atmospheric pressure. Our supplemental observations include rate of rainfall, soil temperature, bright sunshine and solar radiation. High quality and consistent climatological observations are maintained providing data sets to meet the current concerns of the effects of climatic change and increased variability.

Purpose and Benefits

The purpose of the SRC CRS is to provide a record of observed meteorological elements so that the climate of the area and its changes can be accurately documented and described. Climatological data have assumed new importance as a result of social and environmental issues in which climate is a dominant factor. Climatological information assists in realizing new technological opportunities and social changes. It is necessary and valuable for areas such as agriculture, forestry, land use and facility placement, water and energy resources, health and comfort.

The CRS also allows us to:

- evaluate long term climate trends - early warning system for increased frequencies of extreme events such as drought, floods, *etc.*;
- determine the impacts of climate events on society, economy, health, and ecosystems - *e.g.* intense rainfall causing flooding and property damage, heat stress with its implications for health;
- do value-added research;
- be part of regional, national and global networks in an important agricultural and ecological area;
- facilitate development of additional programs - *e.g.* air quality, biodiversity, and climate change monitoring;
- have roles in various programs within SRC including spray drift work, Boreal Ecosystem Atmosphere Study (BOREAS), and collaborative research with the Western College of Veterinary Medicine and the College of Agriculture, University of Saskatchewan, for example; and
- provide climate data to governments, universities, insurance agencies, lawyers, agricultural sectors, chemical companies, schools, building science, construction firms, media, transportation studies, accident studies, wildlife studies, tourism groups and interested individuals.

Goals

The goals of the Climate Reference Station are first, to maintain the high quality of data gathered over its more than forty-five years of existence at its current location and, second, to continue to monitor a large variety of elements. These various elements combined with the long-term collection period as well as the stable location allow CRS to be a very valuable climate information collection station.

[1] *Environment Canada 1992* [2] *World Meteorological Organization 1988*

photo credit: C.R. Beaulieu

ACTIVITIES ASSOCATED WITH THE CLIMATE REFERENCE STATION, 2008

This is the fourth year the SPLIT programme (Schools Plant Legacy in Trees) has requested a presentation on climate for their participants. This programme, sponsored by various community organizaitons and the City of Saskatoon, is where students take a leadership role in developing a more natural landscape around their schools and learn many valuable lessons about the role forests and trees have in their daily lives. Approximately 100 students, grade 6 to grade 8, received hands-on experience with the weather instruments used to measure temperature, precipitation, wind and solar radiation. The computer presentation highlighted Saskatoon's climate: past, present and future and why consideration of the climate is necessary for the planning of the urban landscape.

SRC Staff also participated in the Saskatoon Tribal Council's "Super Saturday": a programme to encourage aboriginal youth to stay in school. Saskatchewan Research Council personnel demonstrated various research projects, including weather and climate, to about 80 children and their chaperones. Along with these previous events, two additional presentations were given to urban and rural schools involving approximately 50 children.

CRS continued to host the Sonic Detection and Ranging (SODAR) system during 2008. SODAR isused to remotely measure the vertical turbulence structure and wind profile of the lower layer of the atmosphere with sound. It can also measure wind speed, wind direction and turbulent characteristics between 20 and 200m without the necessity of erecting a high tower.

CRS was also host for SRC Air Quality's TEOM® Ambient Particulate (PM-10) Monitor. This instrument measures Saskatoon's air pollution from dust and other particulates down to 10 microns.

One of many resident gophers at CRS – photo credit: CR Bradley

SUMMARIES FOR 2008

Overview

Data concerning temperature, precipitation, wind speed and direction, bright sunshine, solar radiation, and soil temperatures, recorded at the Saskatchewan Research Council (SRC) Climatological Reference Station (CRS) (52°09'N, 106°36'W, 497 m asl), are presented for the year 2008 and compared with the long-term (*circa* 1900-2007) and standard-period/normal (1971-2000) records.

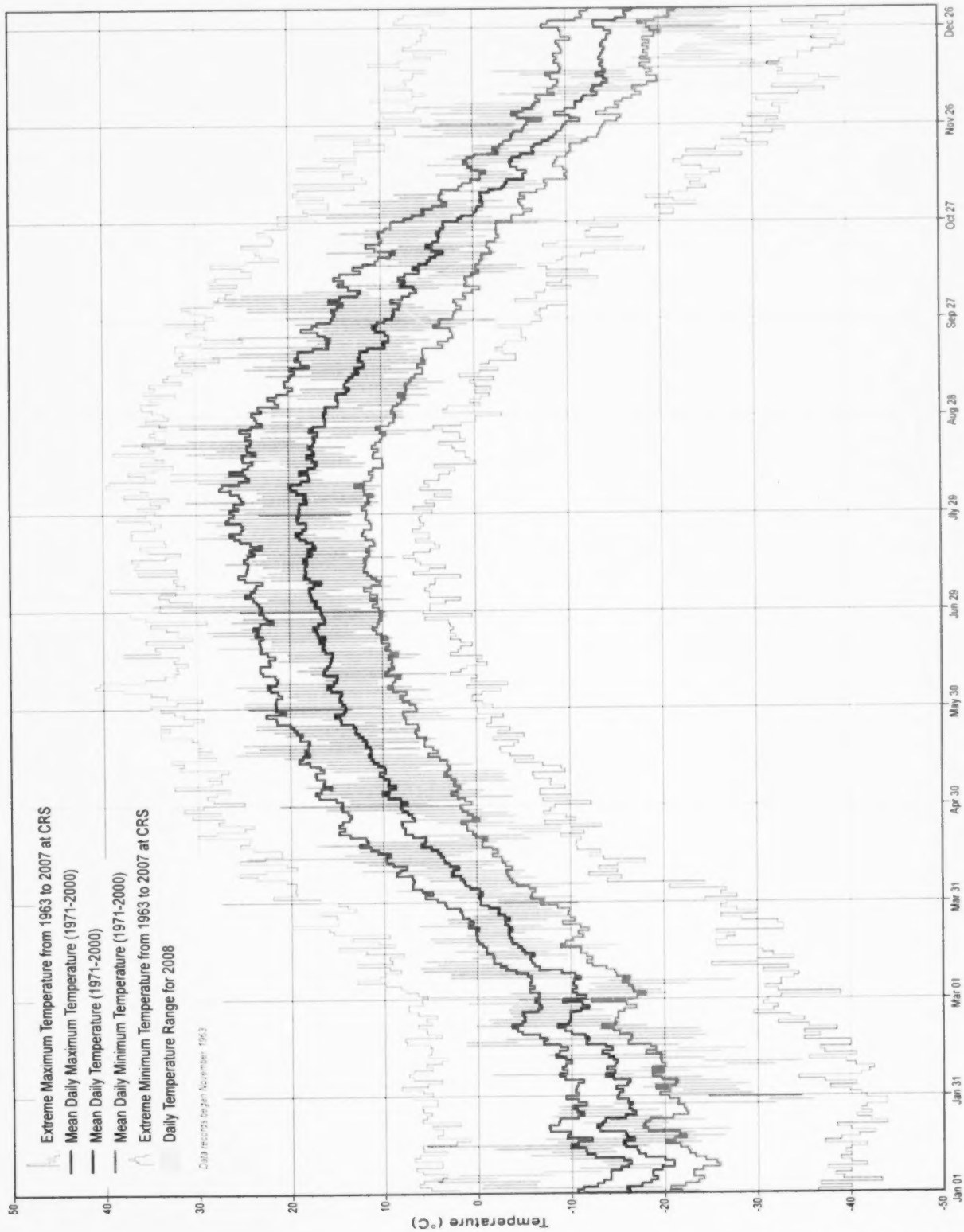
Gorgeous fall temperatures extending into November and December rendered people mentally unprepared for the icebox conditions that encased the last two thirds of December. You know it has been extremely cold when the temperature manages to climb to -20°C and people comment "how warm it is". Over all, temperatures for 2008 placed just slightly above the median when ranked. This illusion of an average year is dispelled when seasonal temperatures are considered. Winter and spring were cool while autumn temperatures, for the minimum and maximum average temperatures, were the 2nd and 4th warmest for the last 45 years. For the monthly mean temperature, 10 out of the 12 months were above or near normal. Only February and December had below normal values. The year experienced 13 days of temperatures less than -30°C, 8 of which were less than -32°C. At the other end of the spectrum, 12 days had temperatures over +30°C, 2 of which were over 35°C. Thirty-two various temperature records were set during the year including seven daily maximum and one daily minimum. The frost-free season of 122 days continued the stretch of above normal years to 16. The season began and ended late: May 26 (normal May 21) to September 26 (normal September 14). Growing degree-days were slow to accumulate due to the cool spring but pick up in June and July and by August were above normal.

Precipitation honours belong to two dates: July 19th followed by June 26th. They recorded the top intensities for ½ hour, 1 hour, 2 hours, 6 hours, 12 hours, daily and more-than-one-consecutive-day. However, the longest spell of precipitation was not during the summer but just before temperatures sank to the lower depths in December. Snow was recorded for 10 days from December 5th to the 14th. The longest dry spell of 19 days occurred from February 15th to March 4th. July received the most rain with 80.0mm, but October was the wettest month with 175% above normal precipitation. Only June, July and October had above normal precipitation. Overall, 2008 was below normal for precipitation ranking as the 15th driest year at CRS. Winter was the 3rd driest; spring tied for 2nd; summer; 30th and autumn; 24th. During 2008, one third of the days (121), some form of precipitation were noted. Summer had the highest percentage of days at 39%.

Annual bright sunshine values were 13.8% above normal with only November having below normal hours. 2008 ranked 3rd in the number of bright sunshine hours compare to the number of possible hours for the past 45 years. With 333 days, this year ranked 4th for the total number of days with bright sunshine. The number of days range between a low of 300 (1992) to a high of 337 (1979). May 2008 had 27% above normal hours creating a spike in both the global radiation value and the bright sunshine value. Global radiation was above normal for 6 of the 12 months.

Wind speeds, greater than 51km/h, occurred on 51 days during the year. Gale winds (63-75 km/h) occurred 14 times, while Strong Gale winds (76-87 km/h) occurred twice; on June 30th and July 27th. The strongest wind gust of 82.4 km/h occurred from the west on the night of July 27th, an hour before midnight while Saskatoon was under a tornado watch. Environment Canada reported that "around 10:30pm, several funnel clouds were spotted north of Saskatoon, but none touched down"[1]. During the year, the average and peak winds occurred the strongest from the northwest. The southeast was the most common direction for average and peak wind frequencies.

DAILY TEMPERATURE RECORD FOR 2008

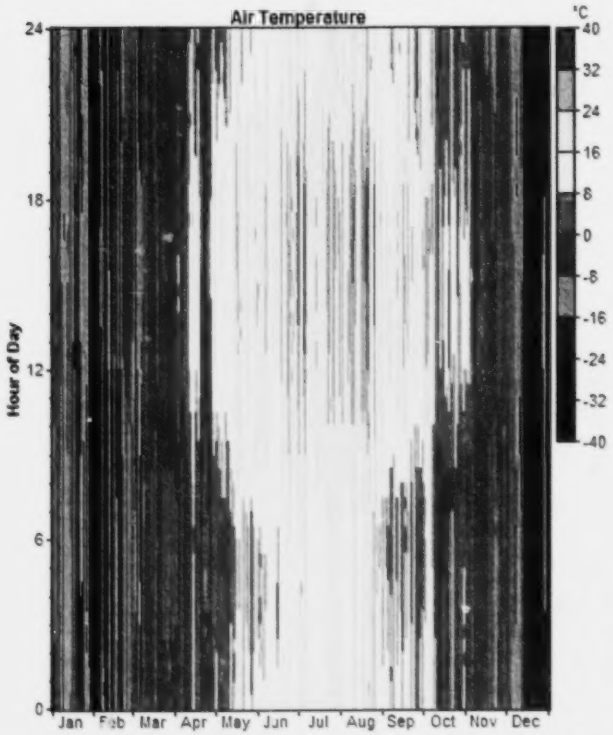


TEMPERATURE

2008 TEMPERATURE RECORDS °C			
TYPE	DATE	NEW RECORD	OLD RECORD/year
Highest Daily **Maximum** Temperature (°C)	January 5	5.0	4.0/1984
	March 1	6.2	5.5/1994
	April 13	24.8	22.8/1969&77
	June 30	34.7	34.0/1989
	July 4	34.0	32.3/1996
	August 19	37.9	35.8/2003
	August 25	36.3	33.9/1999
Lowest Daily **Maximum** Temperature (°C)	January 29	-31.1	-29.4/1969
	February 10	-24.2	-23.0/1985
	April 21	-4.8	-3.3/1973
	April 22	-3.2	2.2/1965,67,68&73
	April 23	0.8	1967&68
	August 31	12.6	13.3/1973
	December 14	-28.7	-26.7/1973
Highest Daily **Minimum** Temperature (°C)	January 5	-1.9	-2.5/1984
	August 20	19.3	16.7/1972
	October 4	11.2	8.3/1975
	October 5	11.3	11.1/1965
	November 3	5.0	2.0/1989
Lowest Daily **Minimum** Temperature (°C)	December 22	-36.9	-36.5/1983
Highest Daily **Average** Maximum Temperature (°C)	January 5	1.6	0.9/1984
	April 13	14.2	14.2/1969&77
	August 19	27.9	26.8/2003
	August 20	25.1	24.1/1999
	August 25	27.3	25.8/1969
	October 4	18.1	14.8/1984
Lowest Daily **Average** Minimum Temperature (°C)	April 21	-6.9	-4.2/1967&73
	April 23	-6.1	-3.9/1967
	December 14	-31.1	-30.6/1963
Highest Minimum Monthly Maximum Temperature (°C)	September	13.3	13.0/1987

DATES & DURATION OF THE FROST-FREE SEASON			
YEAR	LAST SPRING FROST	FIRST FALL FROST	Frost-free Season Length
1964	May 31	Sept 26	117
1965	May 27	Sept 05	100
1966	May 19	Sept 13	116
1967	Jun 06	Sept 23	108
1968	May 19	Sept 25	128
1969	Jun 14	Sept 15	92
1970	May 19	Sept 12	115
1971	May 18	Sept 20	124
1972	May 08	Sept 04	118
1973	May 06	Sept 14	130
1974	May 25	Sept 02	99
1975	May 21	Sept 11	112
1976	May 06	Aug 28	113
1977	May 01	Aug 31	121
1978	May 30	Sept 30	122
1979	May 30	Aug 13	74
1980	May 14	Aug 26	103
1981	May 24	Sept 03	101
1982	May 29	Aug 27	89
1983	May 24	Sept 13	111
1984	May 24	Aug 31	98
1985	Jun 04	Sept 06	93
1986	May 17	Sept 06	111
1987	May 21	Oct 06	137
1988	May 02	Sept 19	139
1989	May 28	Sept 10	104
1990	May 13	Sept 21	130
1991	May 27	Sept 18	113
1992	May 23	Sept 14	113
1993	May 17	Sept 14	119
1994	May 09	Oct 04	147
1995	May 22	Sept 18	118
1996	May 12	Sept 29	139
199	May 14	Oct 05	143
1998	May 13	Sept 30	139
1999	May 09	Sept 27	140
2000	May 17	Sept 23	128
2001	May 10	Oct 04	146
2002	May 23	Sept 23	122
2003	May 18	Sept 29	133
2004	May 20	Sept 30	132
2005	May 14	Sept 28	136
2006	May 04	Sept 19	137
2007	May 10	Sept 14	126
2008	May 26	Sept 26	122
1971 - 2000 Normal	May 16	Sept 14	117.6
1981 - 1990 Normal	May 21	Sept 11	111.3

HOURLY ANNUAL TEMPERATURE



EXTREME TEMPERATURES FOR 2008			
COLD SPELL (less than or equal to -30°C)		HOT SPELL (greater than or equal to 30°C)	
DATE	TEMPERATURE °C	DATE	TEMPERATURE °C
January 28	-32.0	June 29	31.6
January 29	-36.1	June 30	34.7
January 30	-34.5	July 4	34.0
February 9	-31.9	August 1	31.2
February 10	-34.7	August 8	32.7
December 13	-31.4	August 10	32.8
December 14	-33.5	August 16	31.0
December 15	-33.6	August 18	33.5
December 20	-31.0	August 19	37.9
December 21	-32.5	August 20	30.9
December 22	-36.9	August 24	31.6
December 23	-31.7	August 25	36.3
December 30	-31.9	Colored cells indicate extremes	

TEMPERATURE RANKINGS

ANNUAL AVERAGE TEMPERATURES °C

MAXIMUM TEMP °C		MINIMUM TEMP °C		MEAN TEMP °C	
1987	11.6	1987	-0.8	1987	5.4
2001	10.8	2006	-1.3	2001	4.6
1981	10.5	1999	-1.4	1981	4.5
1988	10.1	1981	-1.5	1998	4.3
1998	10.1	1998	-1.5	1999	4.2
1999	9.8	2005	-1.6	2006	4.2
2006	9.6	2001	-1.6	1988	3.9
1976	9.5	2007	-2.2	2005	3.8
1997	9.5	1988	-2.3	1997	3.5
2003	9.3	1997	-2.4	2003	3.4
2005	9.1	2003	-2.5	1991	3.2
1986	9.0	1993	-2.5	1986	3.2
1991	8.9	1991	-2.5	2007	3.2
2000	8.8	1992	-2.5	1976	3.0
1984	8.7	1986	-2.6	1992	3.0
1990	8.7	2004	-2.8	2000	3.0
1977	8.6	2002	-2.9	1984	2.9
1980	8.6	1984	-2.9	1993	2.8
2007	8.6	2000	-2.9	2004	2.8
1992	8.5	1964	-2.9	2002	2.8
2008	8.5	1994	-3.2	1964	2.7
2002	8.5	1983	-3.2	1994	2.7
1994	8.5	2008	-3.3	2008	2.6
2004	8.4	1995	-3.4	1990	2.6
1989	8.3	1968	-3.4	1977	2.5
1964	8.2	1976	-3.5	1980	2.4
1993	8.1	1990	-3.6	1989	2.3
1995	7.9	1977	-3.6	1995	2.3
1973	7.8	1989	-3.8	1983	2.2
1968	7.7	1980	-3.8	1968	2.2
1983	7.7	1973	-4.0	1973	1.9
1978	7.4	1970	-4.0	1970	1.7
1970	7.3	1978	-4.6	1978	1.4
1974	7.1	1969	-4.6	1971	1.2
1971	7.1	1971	-4.6	1974	1.2
1967	7.0	1974	-4.7	1967	1.1
1985	6.9	1967	-4.7	1969	1.1
1975	6.9	1985	-4.8	1985	1.1
1969	6.8	1972	-4.8	1975	0.9
1979	6.5	1975	-5.1	1972	0.6
1966	6.4	1966	-5.2	1979	0.6
1965	6.3	1965	-5.3	1965	0.5
1982	6.2	1982	-5.3	1966	0.4
1996	6.1	1979	-5.3	1996	0.4
1972	6.1	1996	-5.5	1982	0.4

SEASONAL MAXIMUM AVERAGE TEMPERATURES °C

WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
1987	-3.6	1977	12.9	2001	26.5	1987	13.1
2006	-4.7	1987	12.7	2003	26.3	1994	11.8
1998	-4.8	1988	12.6	1984	26.1	2001	11.8
2000	-5.4	1981	12.1	1988	26.0	2008	11.8
1992	-5.7	1998	12.0	1970	25.9	1999	11.4
2002	-6.0	2001	11.9	2006	25.6	1981	11.1
1964	-6.6	1994	11.5	1998	25.6	1997	11.0
1983	-7.1	1993	11.4	1997	25.6	2005	11.0
1988	-7.2	1980	11.3	1981	25.3	1976	10.8
2004	-7.2	1986	11.1	1989	25.3	1980	10.8
1986	-7.3	2000	11.0	2002	25.3	1974	10.6
1976	-7.3	1992	10.8	1983	25.0	1979	10.6
1981	-7.4	1991	10.5	1996	24.9	2004	10.5
1977	-7.4	1976	10.4	1991	24.8	1998	10.4
2007	-7.7	1984	10.2	1964	24.6	1967	10.4
2003	-8.0	1999	10.1	2008	24.5	2000	10.3
2005	-8.0	2007	10.1	2007	24.5	1988	10.3
1975	-8.0	2006	10.1	1979	24.5	1975	9.9
1999	-8.0	1968	10.0	1995	24.4	1989	9.8
1984	-8.1	2004	10.0	1967	24.3	2007	9.8
1995	-8.1	1985	10.0	1978	24.2	1990	9.7
1990	-8.2	1990	10.0	1965	24.2	1968	9.7
1991	-8.6	2005	9.9	1969	24.1	2003	9.4
1989	-8.7	1973	9.9	1990	24.1	1970	9.3
2001	-9.3	1978	9.7	1987	24.0	1983	9.2
1970	-9.3	2003	9.4	1972	24.0	1992	8.8
1980	-9.5	2008	9.1	1976	23.8	1971	8.8
1968	-9.8	1972	9.1	1973	23.8	1964	8.8
2008	-10.1	1971	8.6	2000	23.8	1978	8.7
1973	-10.3	1969	8.3	1971	23.6	1977	8.7
1997	-11.0	1995	8.3	1986	23.6	1966	8.6
1967	-11.1	1989	8.2	1994	23.5	1995	8.6
1993	-11.5	1964	8.2	1980	23.5	1993	8.4
1985	-11.6	1966	8.1	1975	23.2	1982	8.3
1994	-12.1	1997	7.6	1999	23.1	1969	8.0
1996	-12.2	1983	7.0	1977	23.0	2002	7.8
1974	-12.6	1982	6.7	1966	22.8	2006	7.5
1966	-13.1	1996	6.3	1982	22.6	1986	7.3
1982	-13.3	1970	6.1	2005	22.6	1965	7.3
1971	-13.4	2002	5.8	1985	22.4	1973	7.3
1978	-14.5	1965	5.7	1974	22.4	1991	7.0
1965	-14.8	1979	4.8	1992	22.4	1972	6.6
1972	-14.9	1974	4.7	1968	22.0	1996	6.2
1969	-15.2	1975	4.4	2004	21.6	1984	5.6
1979	-15.5	1967	4.4	1993	21.1	1985	4.5

TEMPERATURE RANKINGS

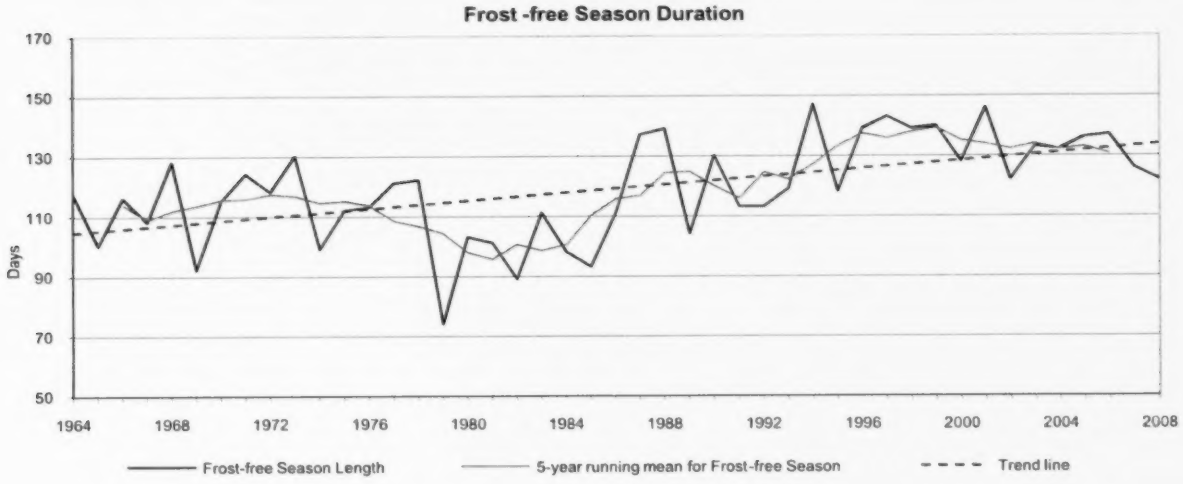
SEASONAL MINIMUM AVERAGE TEMPERATURES °C

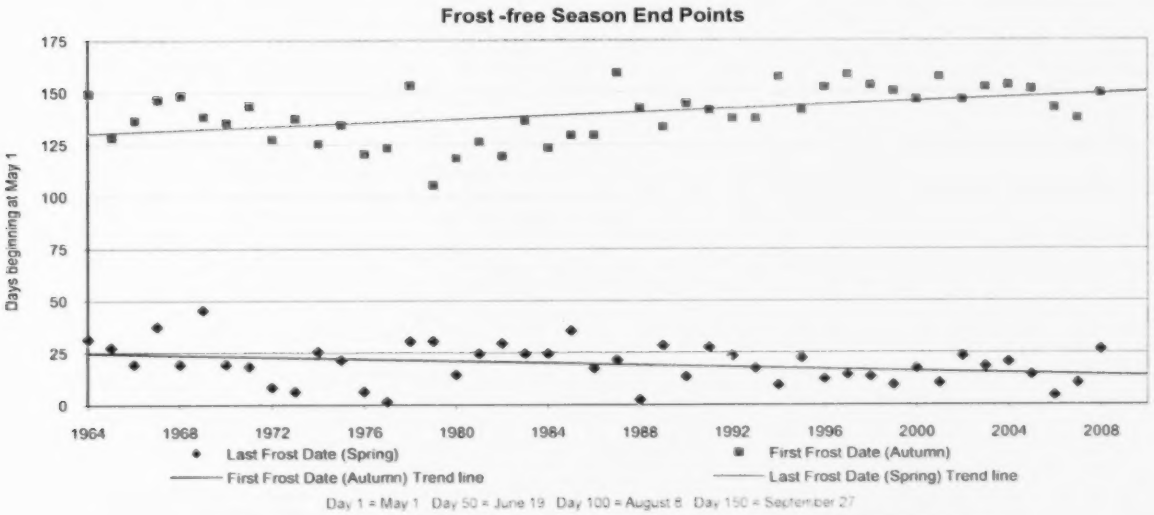
WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2006	-13.2	1993	0.3	2006	12.5	2005	0.4
1998	-13.4	1987	-0.2	2003	12.5	2008	0.1
1987	-13.6	1977	-0.5	1988	12.3	1998	0.1
1992	-14.9	1999	-0.5	1970	12.3	1981	0.0
1964	-15.0	1985	-0.7	2002	12.2	2001	-0.1
2002	-15.5	1994	-0.8	1991	12.2	1967	-0.2
1983	-15.6	1981	-1.0	2001	11.7	1968	-0.2
2000	-15.8	1992	-1.0	2007	11.7	1997	-0.3
2004	-16.7	2006	-1.0	1989	11.6	1987	-0.3
1999	-16.8	1988	-1.0	1998	11.6	2004	-0.4
2007	-17.0	1986	-1.1	1997	11.5	1994	-0.5
1981	-17.1	2000	-1.1	2008	11.3	1999	-0.6
1995	-17.2	2001	-1.2	1984	11.2	1992	-0.7
1986	-17.3	2007	-1.3	1996	11.2	1980	-0.9
2003	-17.5	2005	-1.4	1983	11.2	1983	-1.0
1988	-17.8	1990	-1.5	1964	11.0	1970	-1.1
1976	-17.8	1973	-1.7	2005	11.0	2007	-1.1
1984	-17.8	1978	-1.7	1972	11.0	1964	-1.4
2005	-17.8	1991	-2.0	2000	11.0	1988	-1.4
1975	-18.5	1968	-2.0	1981	10.9	1979	-1.4
1970	-18.7	1998	-2.0	1995	10.8	2000	-1.7
1977	-18.8	1984	-2.2	1990	10.7	1989	-1.8
1989	-18.9	2003	-2.3	1999	10.7	1969	-1.9
2001	-19.0	1972	-2.4	1987	10.6	1971	-2.1
1990	-19.1	2004	-2.5	1994	10.6	2002	-2.2
1991	-19.3	1980	-2.6	1965	10.5	2003	-2.2
2008	-19.5	2008	-3.2	1976	10.5	1977	-2.4
1980	-19.6	1976	-3.3	1971	10.3	1974	-2.4
1968	-20.0	1963	-3.7	1973	10.0	1975	-2.5
1973	-20.3	1969	-3.8	1979	10.0	1993	-2.5
1993	-20.5	1995	-3.8	1966	9.9	1995	-2.6
1994	-20.8	1966	-3.9	1993	9.9	1972	-2.7
1967	-21.1	1964	-3.9	1975	9.8	2006	-2.8
1997	-21.3	1971	-4.0	2004	9.7	1978	-2.9
1996	-21.9	1997	-4.3	1978	9.7	1986	-3.1
1974	-22.6	1982	-4.3	1980	9.6	1990	-3.4
1985	-22.9	1989	-4.3	1982	9.6	1976	-3.6
1971	-23.1	1996	-4.9	1986	9.6	1982	-3.7
1982	-23.6	1970	-5.0	1974	9.6	1991	-3.7
1966	-23.6	1965	-5.8	1967	9.5	1984	-3.8
1969	-24.0	1979	-6.1	1969	9.4	1966	-4.3
1965	-24.0	1974	-6.5	1968	9.2	1996	-4.3
1978	-24.5	1975	-6.5	1992	8.8	1985	-4.4
1972	-25.0	1967	-6.9	1977	8.8	1973	-4.6
1979	-25.2	2002	-7.6	1985	8.2	1985	-6.0

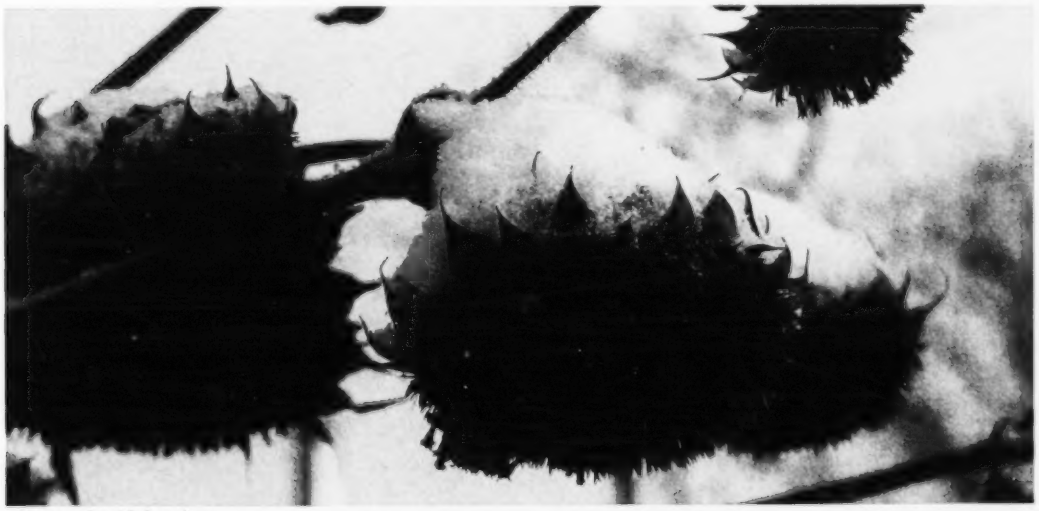
SEASONAL MEAN AVERAGE TEMPERATURES °C

WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
1987	-8.6	1987	6.2	2003	19.4	1987	6.4
2006	-8.9	1977	6.2	1988	19.2	2008	5.9
1998	-9.1	1993	5.8	2001	19.1	2001	5.8
1992	-10.3	1988	5.8	1970	19.1	2005	5.7
2000	-10.6	1981	5.6	2006	19.1	1994	5.7
2002	-10.8	1994	5.4	2002	18.8	1981	5.5
1964	-10.8	2001	5.4	1984	18.7	1999	5.4
1983	-11.4	1986	5.0	1998	18.6	1997	5.4
2004	-12.0	1998	5.0	1997	18.5	1998	5.3
1981	-12.3	1992	4.9	1991	18.5	1967	5.1
1986	-12.3	2000	4.9	1989	18.5	2004	5.0
2007	-12.4	1999	4.8	1983	18.1	1980	5.0
1999	-12.4	1985	4.7	1981	18.1	1968	4.8
1988	-12.5	2006	4.5	2007	18.1	1979	4.6
1976	-12.6	2007	4.4	1996	18.1	1988	4.4
1995	-12.7	1980	4.4	2008	17.9	2007	4.4
2003	-12.7	1991	4.3	1964	17.8	2000	4.3
2005	-12.9	2005	4.3	1995	17.7	1970	4.2
1984	-13.0	1990	4.3	1972	17.5	1974	4.1
1977	-13.1	1973	4.1	2000	17.4	1983	4.1
1975	-13.3	1978	4.0	1990	17.4	1992	4.1
1990	-13.7	1968	4.0	1965	17.4	1989	4.0
1989	-13.8	1984	4.0	1987	17.3	1975	3.8
1991	-14.0	2004	3.8	1979	17.3	1964	3.7
1970	-14.0	2003	3.6	1976	17.2	1976	3.6
2001	-14.2	1976	3.5	1994	17.1	2003	3.6
1980	-14.6	1972	3.4	1978	17.0	1971	3.4
2008	-14.8	2008	2.9	1971	17.0	1977	3.2
1968	-15.0	1971	2.3	1973	17.0	1990	3.2
1973	-15.4	1969	2.2	1999	16.9	1969	3.1
1993	-16.0	1995	2.2	1967	16.9	1995	3.0
1967	-16.1	1964	2.2	2005	16.8	1978	2.9
1997	-16.2	1966	2.1	1969	16.7	1993	2.9
1994	-16.5	1989	2.0	1988	16.6	2002	2.8
1996	-17.1	1997	1.7	1980	16.6	2006	2.4
1985	-17.3	1983	1.6	1975	16.5	1982	2.3
1974	-17.6	1982	1.2	1966	16.4	1966	2.2
1971	-18.3	1996	0.7	1982	16.2	1986	2.1
1966	-18.4	1970	0.5	1974	16.0	1972	1.9
1982	-18.5	1965	-0.1	1977	15.9	1991	1.8
1965	-19.4	1979	-0.7	2004	15.7	1965	1.5
1978	-19.5	1974	-0.9	1992	15.6	1973	1.3
1969	-19.6	2002	-0.9	1985	15.6	1984	0.9
1972	-20.0	1975	-1.0	1993	15.5	1996	0.9
1979	-20.4	1967	-1.2	1985	15.3	1985	-0.8

TEMPERATURE







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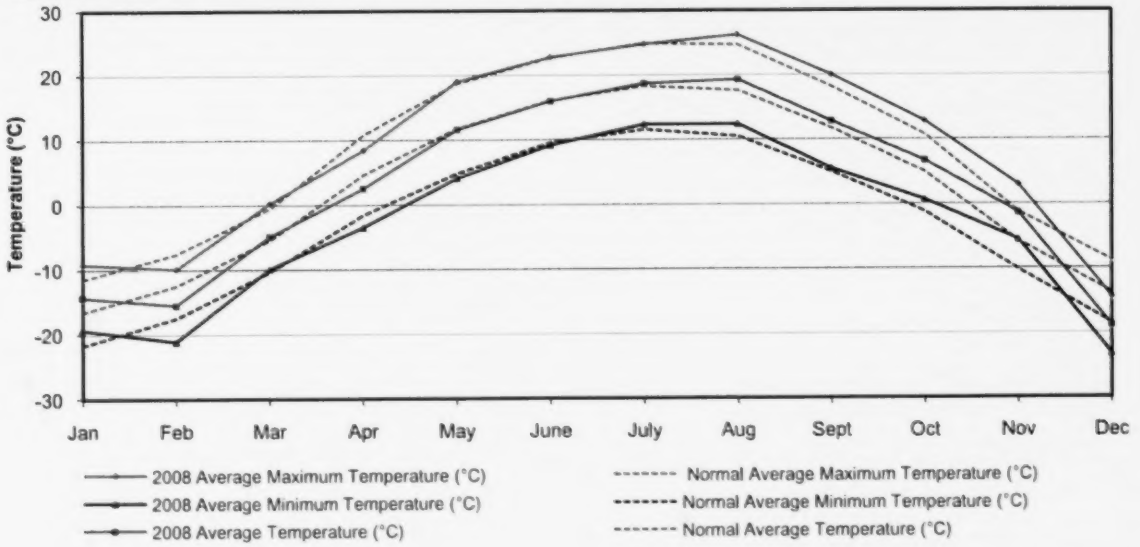
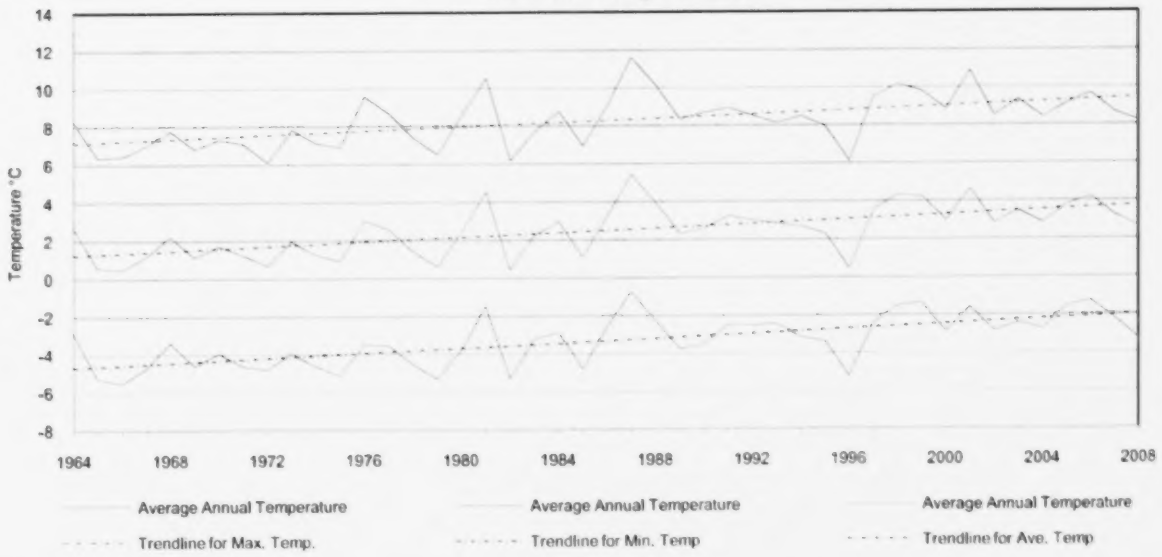
SRC Publication No. 10440-11.09

TEMPERATURE

MONTH	AVERAGE MAXIMUM TEMPERATURE (°C)		AVERAGE MINIMUM TEMPERATURE (°C)		AVERAGE TEMPERATURE (°C)		EXTREME VALUES TEMPERATURE (°C)		EXTREME VALUES FOR SASKATOON STATIONS	
	2008	Normal	2008	Normal	2008	Normal	Max/Date	Min/Date	Max/Date	Min/Date
January	-9.3	-11.6	-19.4	-21.8	-14.4	-16.7	5.7/15	-36.1/29	11.0/1980/23	-48.9/1893/31
February	-10.0	-7.7	-21.2	-17.6	-15.6	-12.6	1.4/16	-34.7/10	12.8/1931/19	-50.0/1893/01
March	0.1	-0.7	-10.0	-10.5	-5.0	-5.6	6.3/23	-27.6/06	22.8/1910/23	-43.3/1897/14
April	8.3	10.7	-3.6	-1.7	2.4	4.5	24.8/13	-12.2/05	33.3/1952/28	-30.5/1979/01
May	18.9	18.6	4.0	4.7	11.5	11.6	25.9/15	-3.8/02	37.2/1936/27	-12.8/1907/06
June	22.7	22.6	9.1	9.5	15.9	16.0	34.7/30	3.2/03	41.0/1988/06	-3.9/1917/02
July	24.7	24.8	12.3	11.5	18.6	18.2	34.0/04	7.7/02	40.0/1919 1941 1946	-0.6/1918/25
August	26.1	24.6	12.3	10.4	19.2	17.5	37.9/19	4.6/23	39.7/1998/06	-28.1901 23&1976 28
September	19.9	18.1	5.4	4.9	12.7	11.6	29.3/18	-2.3/26	35.6/1978/04	-11.1/1908/28
October	12.7	10.6	0.5	-1.3	6.6	4.8	27.9/02	-9.0/27	32.2/1943/05	-25.6/1919/26
November	2.8	-1.4	-5.7	-10.3	-1.5	-5.9	14.0/01	-12.6/20	21.7/1903/03	-39.4/1893/30
December	-14.6	-9.0	-23.4	-18.6	-19.0	-13.9	6.0/01	-36.9/22	14.4/1939/05	-43.9/1892/22
Average	8.5	8.3	-3.3	-3.4	2.6	2.5				



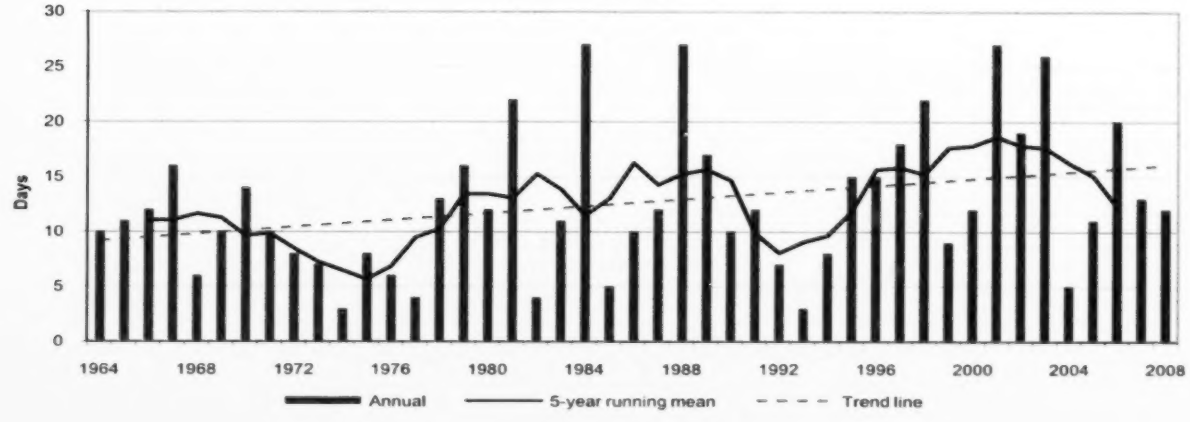
Annual Temperatures



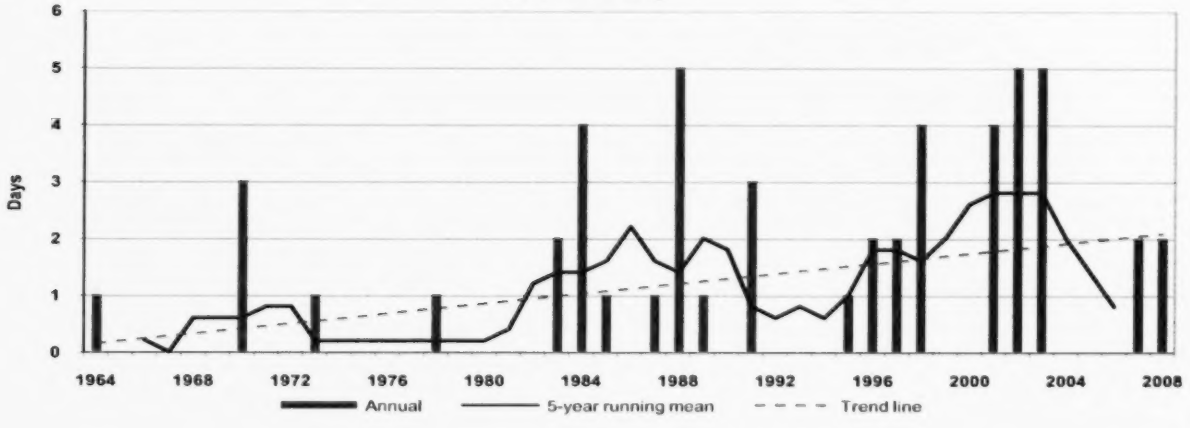
SEASONAL TEMPERATURES

ANNUAL DAYS WITH TEMPERATURES GREATER THAN A SET POINT

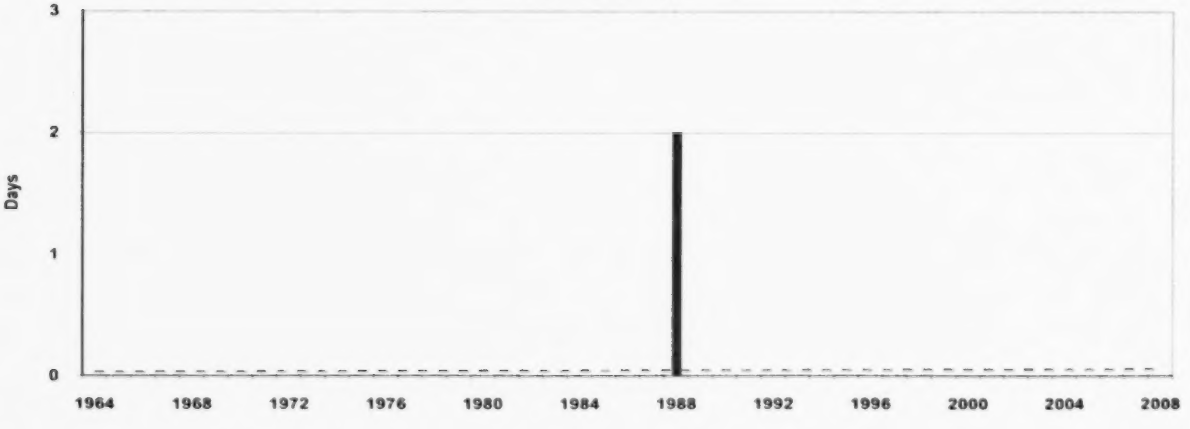
Temperatures 30°C or Greater
(1964 to 2008)



Temperatures 35°C or Greater
(1964 to 2008)

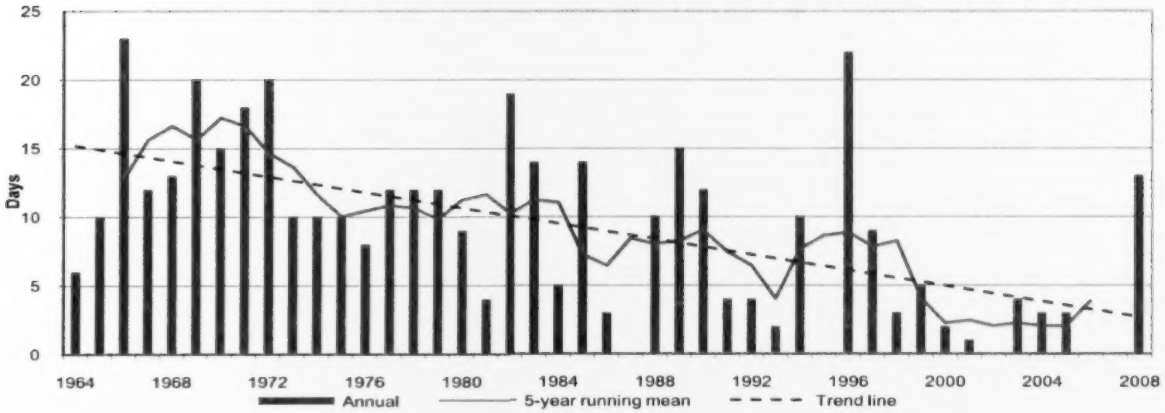


Temperatures 40°C or Greater
(1964 to 2008)

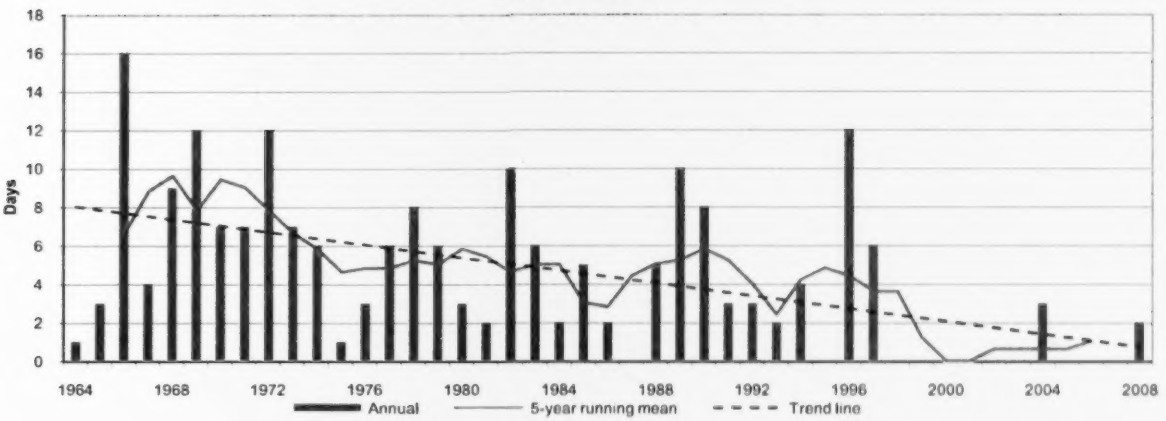


ANNUAL DAYS WITH TEMPERATURES LESS THAN A SET POINT

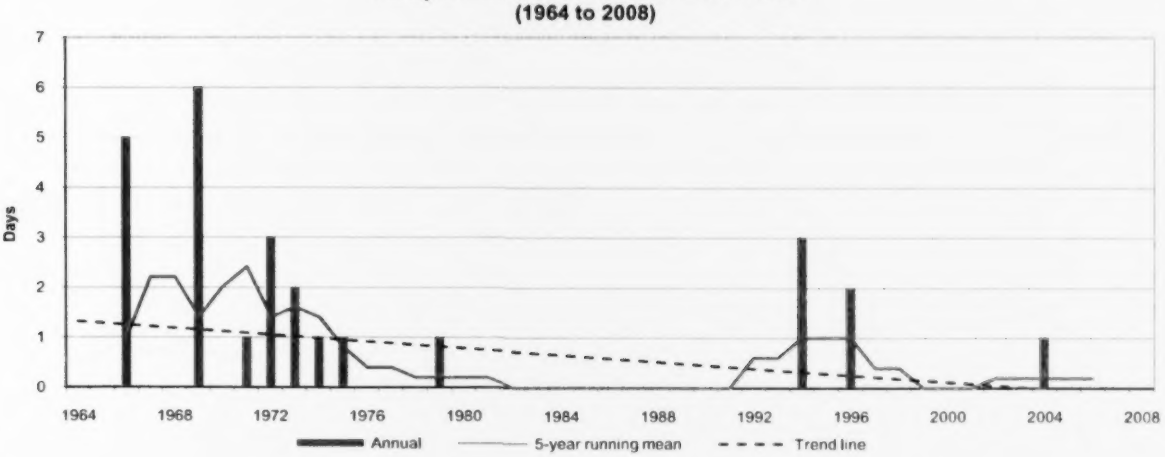
Temperatures minus 30°C or Less
(1964 to 2008)



Temperatures minus 35°C or Less
(1964 to 2008)

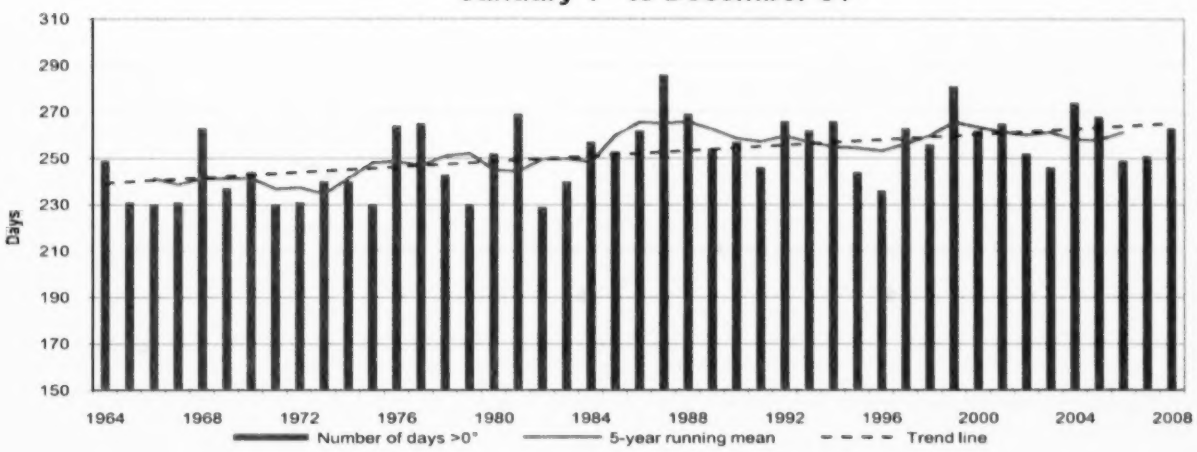


Temperatures minus 40°C or Less
(1964 to 2008)

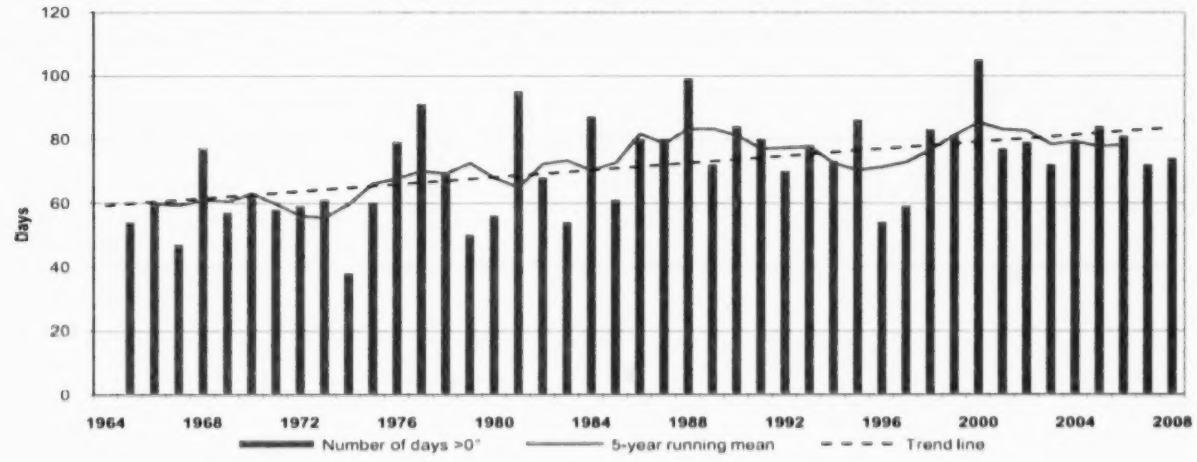


ANNUAL DAYS WITH TEMPERATURES GREATER THAN 0°C (THAW DAYS)

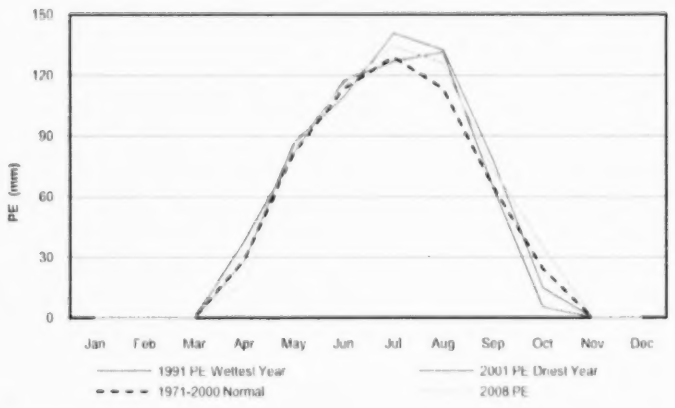
January 1st to December 31st



October 1st to March 31st (Cold Season)



POTENTIAL EVAPOTRANSPIRATION (PE) using the Thornthwaite Method[1]

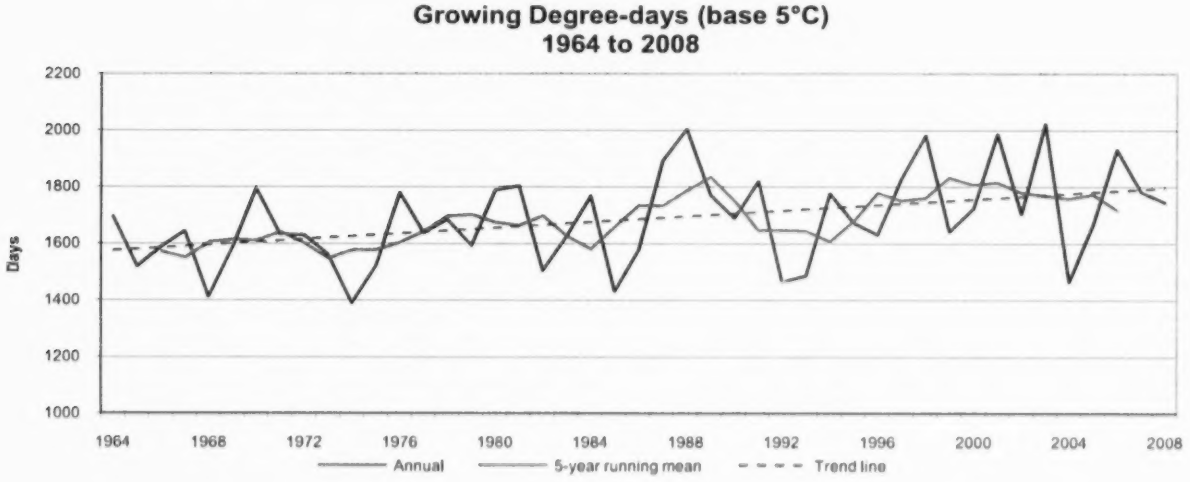


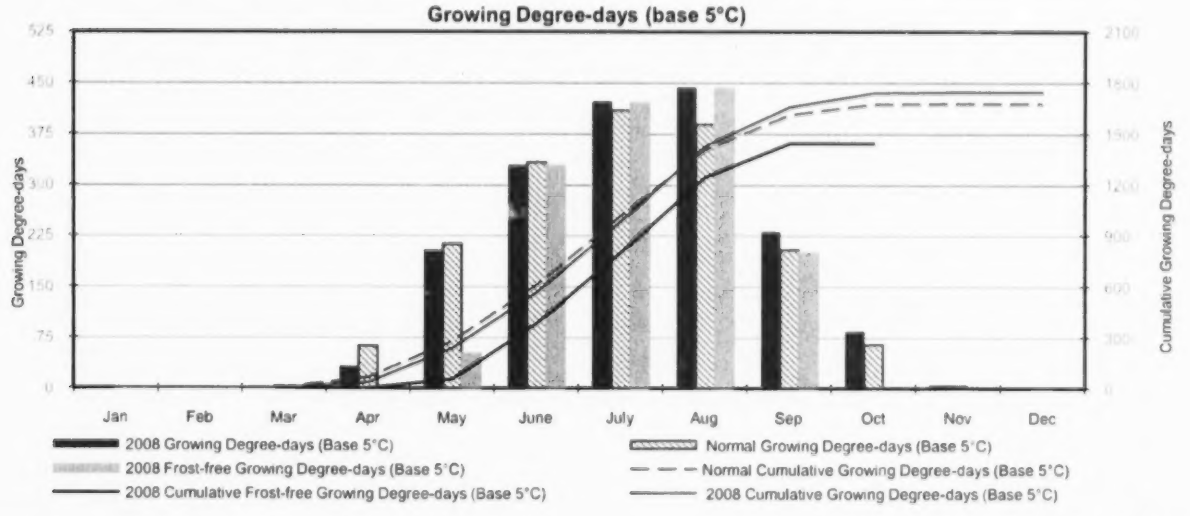
MONTH	PE (mm) 2008	PE (mm) 1991 Wettest Year	PE (mm) 2001 Driest Year	PE (mm) 1971-2000 Normal
Jan	0.0	0.0	0.0	0.0
Feb	0.0	0.0	0.0	0.0
Mar	0.0	0.0	0.0	0.0
Apr	17.7	37.5	28.5	28.6
May	84.3	81.3	86.8	81.5
June	116.5	116.8	109.3	113.2
July	134.1	126.7	140.6	125.9
Aug	125.9	131.3	132.4	113.3
Sept	73.5	64.8	78.1	64.9
Oct	35.3	5.4	14.8	24.3
Nov	0.0	0.0	0.0	0.0
Dec	0.0	0.0	0.0	0.0
Total	586.4	563.7	590.4	554.6

[1] Thornthwaite 1955

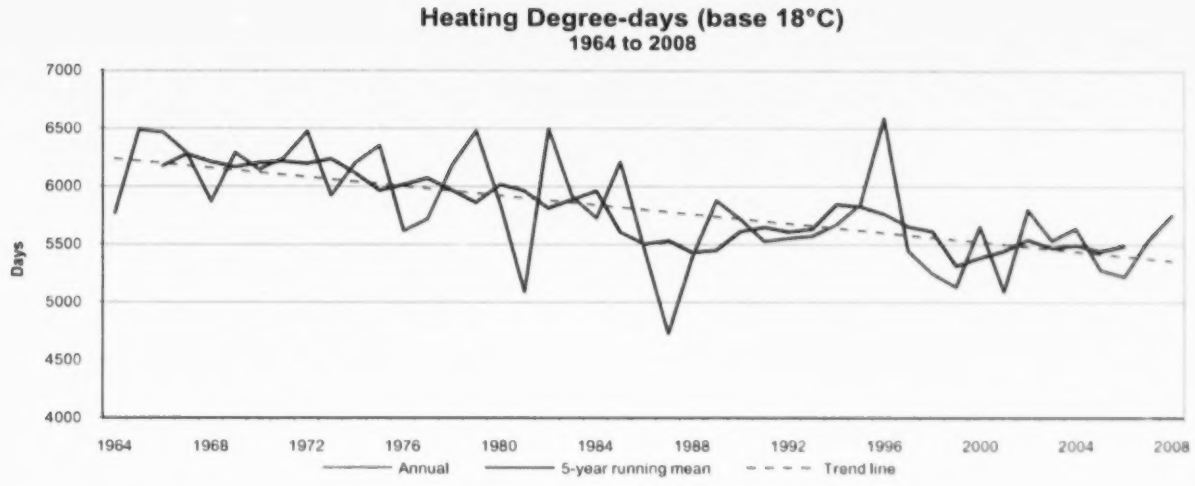
DEGREE-DAYS

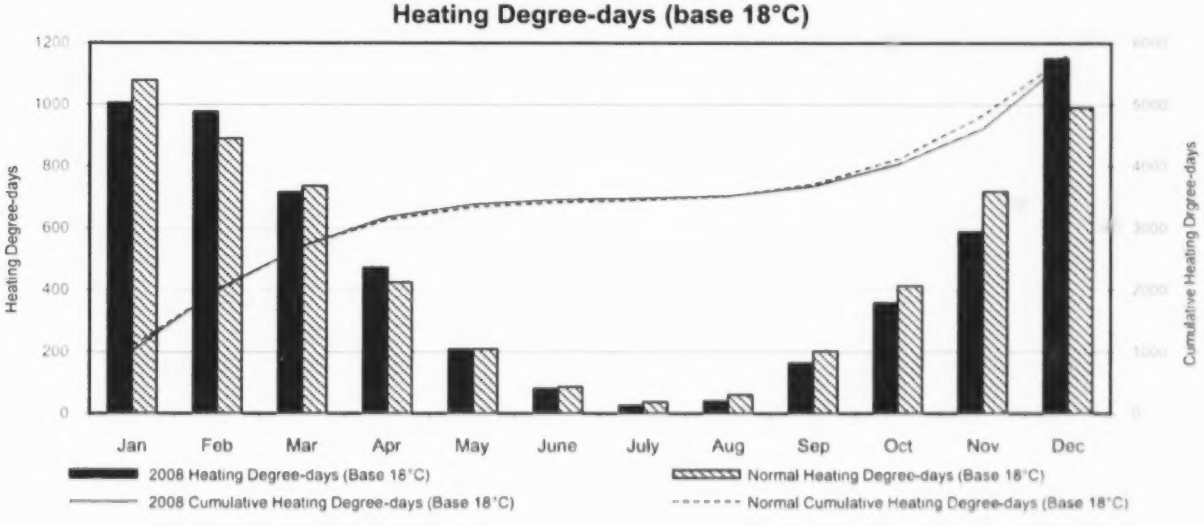
MONTH	GROWING DEGREE-DAYS Base 18°C			HEATING DEGREE-DAYS Base 18°C			COOLING DEGREE-DAYS Base 18°C			EXTREME COOLING DEGREE-DAYS Base 24°C		
	2008	Cumulative	Normal	2008	Cumulative	Normal	2008	Cumulative	Normal	2008	Cumulative	Normal
January	0.0	0.0	0.0	1003.1	1003.1	1076.9	0.0	0.0	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	974.3	1977.4	1963.1	0.0	0.0	0.0	0.0	0.0	0.0
March	0.0	0.0	2.4	712.5	2689.9	2695.5	0.0	0.0	0.0	0.0	0.0	0.0
April	31.3	31.3	63.7	469.1	3159.0	3116.2	0.0	0.0	0.3	0.0	0.0	0.0
May	202.4	233.7	275.3	203.9	3362.9	3320.6	1.4	1.4	7.7	0.0	0.0	0.2
June	327.4	561.1	606.8	77.7	3440.6	3403.4	15.1	16.5	30.0	0.2	0.2	1.3
July	420.7	981.8	1015.2	22.4	3463.0	3438.7	40.1	56.6	70.7	1.0	1.2	2.8
August	441.7	1423.5	1403.0	37.4	3500.4	3496.4	76.1	132.7	113.2	9.7	10.9	5.2
September	229.7	1653.2	1606.5	160.8	3661.2	3695.3	0.5	133.2	119.0	0.0	10.9	5.3
October	83.4	1736.6	1670.2	353.5	4014.7	4105.5	1.0	134.2	119.1	0.0	10.9	5.3
November	4.7	1741.3	1672.8	583.6	4598.3	4821.3	0.0	134.2	119.1	0.0	10.9	5.3
December	0.0	1741.3	1672.8	1147.5	5745.8	5809.0	0.0	134.2	119.1	0.0	10.9	5.3





DEGREE-DAYS



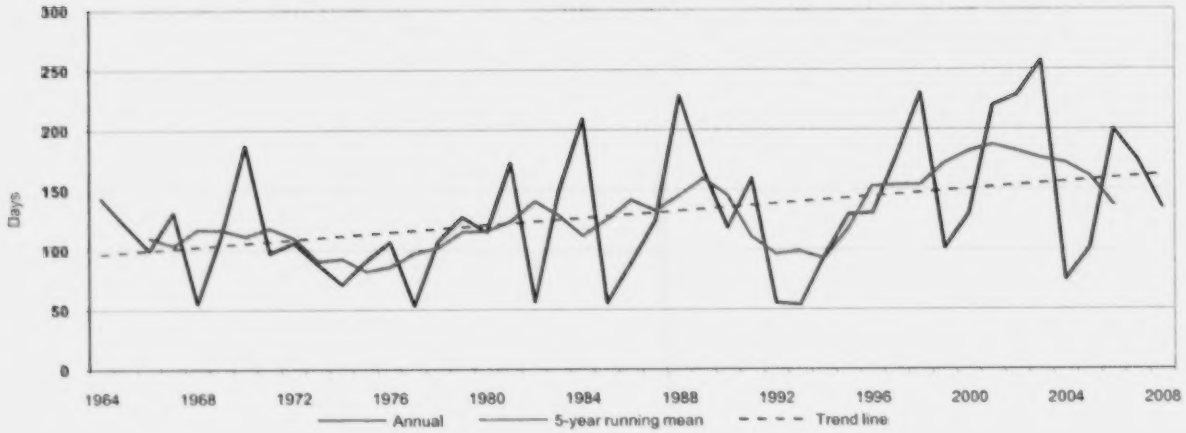


"When a person is accustomed to 128° (F) in the shade, his ideas about cold weather are not valuable. So I take "cold weather" is merely a conventional phrase and has come into use through the necessity of having some way to distinguish between weather which will melt a brass door-knob and weather which will only make it mushy."

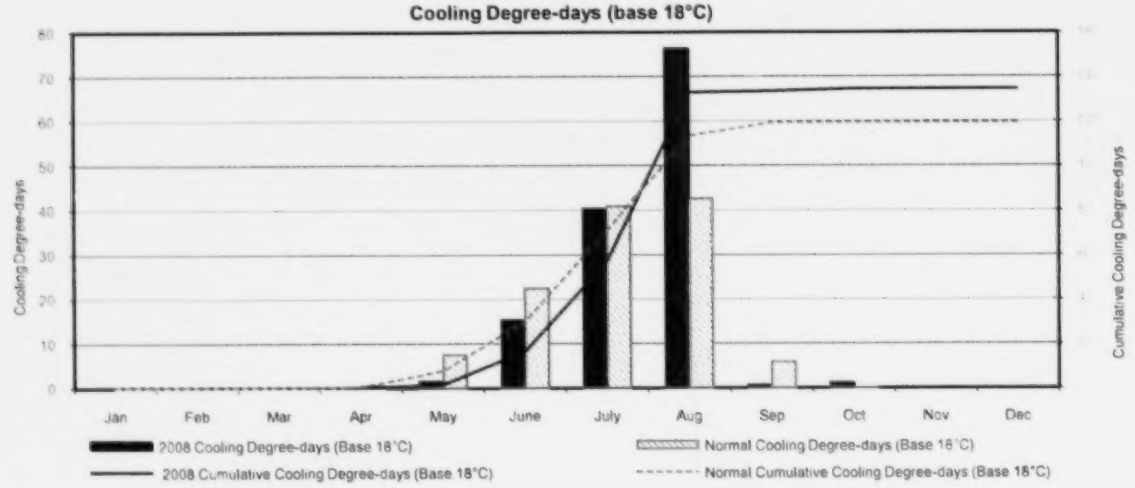
Following the Equator by Mark Twain

DEGREE-DAYS

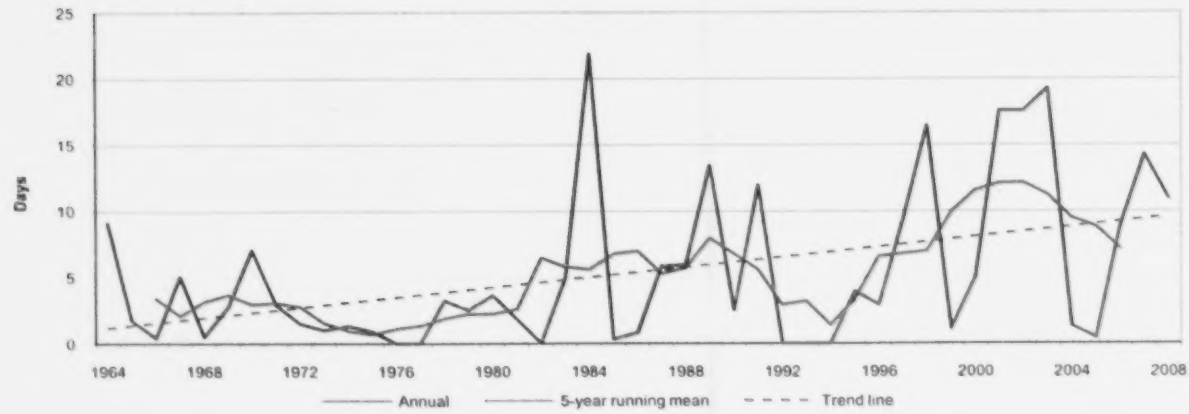
Cooling Degree-days (base 18°C)
1964 to 2008



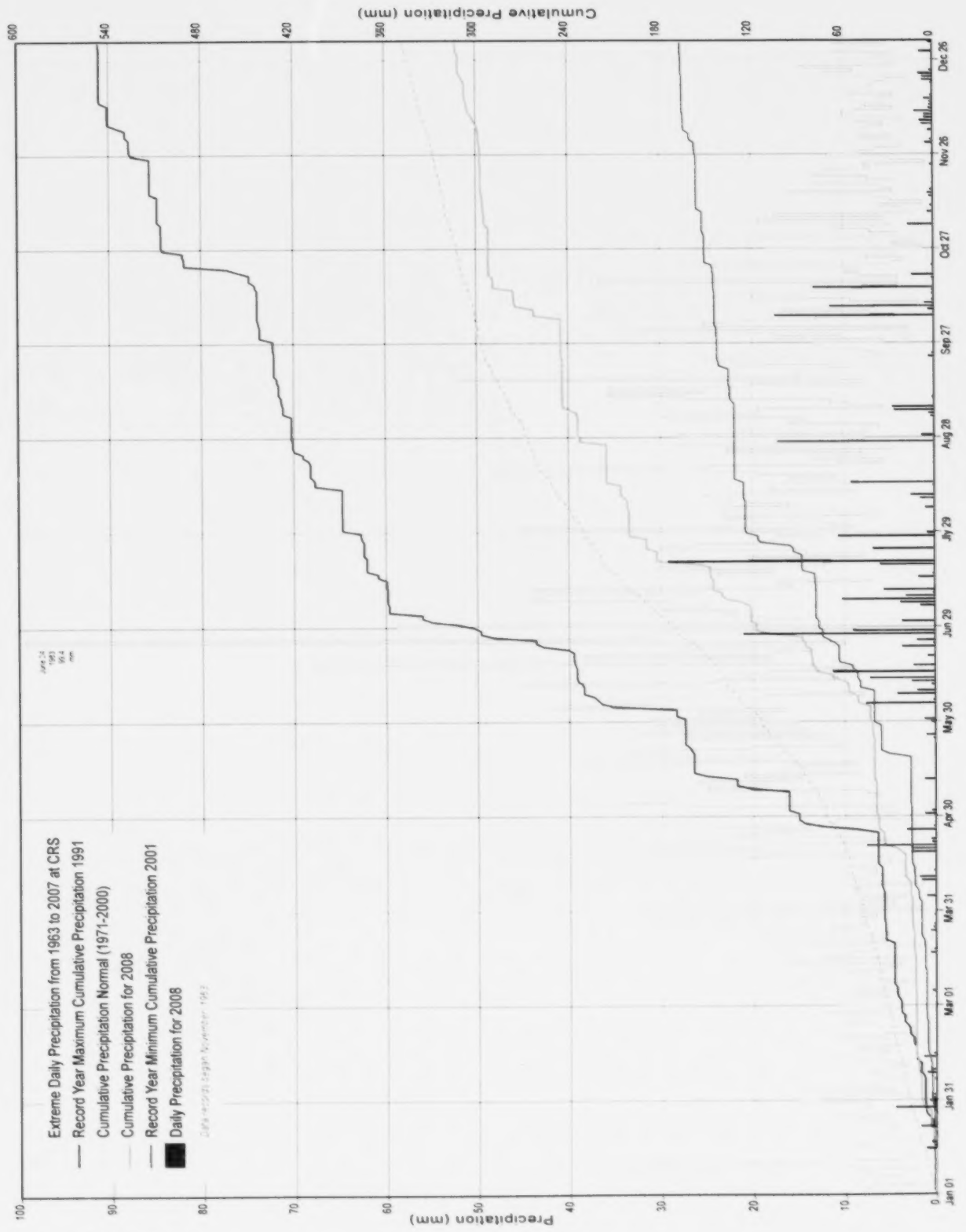
Cooling Degree-days (base 18°C)



Extreme Cooling Degree-days (base 24°C)
1964 to 2008



DAILY PRECIPITATION RECORD FOR 2008



PRECIPITATION RANKINGS

ANNUAL RANKING BY DRIEST YEAR (mm)

ANNUAL		WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2001	165.8	2002	12.1	2002	20.3	1984	70.2	1999	17.2
1987	232.4	1984	19.2	1998	29.8	1964	73.9	1994	21.0
2003	257.7	2008	21.6	2008	29.8	1977	81.9	1976	21.8
1998	263.3	1993	22.0	2001	34.0	2001	91.2	1987	27.4
1981	279.8	1998	22.4	1980	42.2	1985	91.8	2001	28.5
1964	282.7	2001	23.1	1965	43.2	1987	92.6	2007	30.8
1988	285.7	2003	29.2	1981	54.3	1969	105.5	2000	31.2
1992	288.1	2004	29.3	2004	55.4	1992	115.6	1972	32.3
1997	291.4	1987	30.6	1992	55.5	1997	116.4	1990	33.9
1984	293.1	1995	31.3	1988	55.6	1980	120.3	1971	34.2
1999	297.7	1999	31.3	1999	56.5	1981	124.9	1988	38.1
1993	300.0	2000	31.7	1984	57.2	2003	126.2	1974	40.0
1980	305.9	2006	32	1996	58.8	1972	133.3	1975	48.8
1990	309.8	1988	35.9	2000	59.2	1998	133.4	2004	50.0
2008	313.8	1982	37.0	1971	61.1	1979	135.9	1966	50.2
2000	315.4	1967	37.9	1966	61.2	1967	139.9	1965	50.9
1972	317.9	1991	40.3	2003	61.8	1978	142.5	2003	51.2
2002	320.0	1983	41.1	2005	62.1	1975	144.5	1995	52.6
1995	327.7	1977	43.1	1993	62.2	1990	144.5	1979	53.4
1985	330.6	1994	45.1	2007	64.7	1988	148.9	1985	55.2
1976	331.8	2005	45.4	1995	65.4	1989	149.9	1970	56.4
1996	340.6	1964	47.9	1970	65.7	1993	151.0	1981	61.4
1994	341.4	1997	48.0	1964	65.8	1996	154.4	1997	61.6
1979	352.0	1996	51.0	1969	68.5	1973	156.1	2008	64.4
1967	354.3	1981	52.2	1976	69.1	1995	164.4	1989	64.5
1978	358.1	1985	52.3	1972	71.6	1994	165.6	1977	65.4
1965	358.8	1970	52.7	1978	72.8	1976	169.4	1992	65.9
1977	370.5	1968	53.8	1973	73.1	2000	183.8	1980	66.6
1966	376.9	1966	54.7	1987	73.6	2006	183.8	1998	70.0
1989	384.8	1992	55.0	1967	78.0	2008	191.2	1968	71.3
1970	388.8	1990	55.6	1986	82.5	1999	194.2	2002	72.8
1975	392.3	1986	57.2	1990	87.2	1986	196.2	1993	73.1
1973	393.3	1989	57.9	1979	87.3	1974	205.5	1996	74.4
2004	404.5	1971	60.4	1997	88.2	1965	206.6	1967	76.8
1986	411.3	1979	61.3	1968	97.6	2002	206.8	1964	77.4
2007	413.9	1978	63.0	1989	101.7	1982	208.4	1982	81.5
1971	414.6	1973	63.2	2006	101.8	1983	215.8	1986	87.2
1969	427.4	1975	67.3	1994	109.4	1970	216.5	1973	88.2
1982	436.2	1965	69.3	1982	110.8	1966	222.0	1983	96.2
1968	443.1	1976	69.5	1975	119.6	1968	225.9	1991	105.4
1974	462.7	1980	73.0	1983	125.2	2007	231.0	2005	109.4
1983	471.6	2007	74.7	1985	134.3	1971	248.8	1978	111.4
2005	486.8	1972	92.2	1991	147.3	1991	251.6	1984	137.0
2006	517.5	1974	92.2	1974	148.0	2004	260.0	1969	151.8
1991	546.9	1969	98.1	1977	164.1	2005	269.4	2006	203.3

ANNUAL RANKING BY DAYS WITH PRECIPITATION

ANNUAL		WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2001	84	2002	16	1964	14	1984	18	1976	9
1964	86	1984	18	1965	16	2001	23	1974	13
1984	88	1987	19	1966	18	1967	25	1999	13
1985	91	1995	21	1968	19	1985	25	1987	14
1965	94	1985	22	1988	19	2003	26	1997	14
1966	98	1988	23	1992	20	1969	27	1994	15
1986	98	1994	23	1994	20	1964	28	1966	17
1997	98	2001	23	2001	20	1970	28	1964	18
1967	100	1964	24	1967	21	1979	28	1990	18
1994	101	1993	24	1981	21	1998	28	1982	19
1987	102	1996	24	1978	22	1965	29	1988	19
1990	105	1968	25	1980	22	1971	31	2000	19
1968	106	1999	25	1986	22	1983	31	1995	20
1993	106	1966	26	1998	22	2007	31	1979	21
1998	106	1967	26	2002	22	1988	32	1968	22
1985	107	1986	26	1972	23	1990	32	1972	22
1995	107	2008	26	1976	23	1995	32	1993	22
1999	107	1965	27	1984	24	1968	33	2005	22
2002	107	1989	27	1996	24	1977	33	1971	23
1996	110	1990	27	1985	25	1992	33	1980	23
2003	110	1998	27	2008	25	1996	34	1986	23
1981	113	2004	29	1970	26	1997	34	1965	24
1976	115	1992	30	1971	26	1999	34	1981	24
1992	116	1997	30	1973	26	1966	35	1996	24
2000	118	2000	30	1987	27	1975	35	1998	24
2008	121	2007	30	1990	27	1980	35	2001	24
1971	122	1977	31	1991	27	1987	35	1973	25
1980	123	1975	33	1969	30	1993	35	1975	25
1989	124	1991	33	1989	30	2000	35	2003	25
1970	126	2003	33	1995	30	2006	35	1967	27
1979	126	1982	34	2003	30	1972	36	2008	27
1973	127	1973	36	2007	30	1989	36	1985	28
1972	128	1980	36	1977	31	2002	36	1984	29
2007	128	1981	36	1993	31	2008	36	2002	29
1977	129	2006	36	1999	31	1986	37	1977	30
1975	130	2005	37	1997	32	1973	38	1991	30
1991	131	1970	40	2000	32	1974	38	1989	31
1983	132	1971	40	1982	34	1981	38	1969	32
2005	135	1976	40	1975	35	1976	39	1970	32
1974	136	1976	41	1974	36	2005	40	1983	32
1982	136	1983	41	1983	36	1994	41	1992	33
1978	139	1972	46	2005	36	1982	42	2004	34
2006	139	1979	48	2006	36	1991	42	1978	36
1969	147	1974	57	1979	37	2004	42	2007	36
2004	156	1969	61	2004	44	1978	43	2006	38

PRECIPITATION RANKINGS

RANKING BY DRY SPELLS/DAYS

Maximum Length of Dry Spell		Total number of Dry Days	
1976	48	2001	282
1993	40	1964	280
2000	40	1984	278
1965	37	1988	275
1980	36	1965	271
1997	36	1966	267
2002	35	1986	267
1964	31	1997	267
1984	30	1987	266
1966	28	1967	265
1974	28	1994	264
1968	27	1968	260
2004	25	1990	260
1972	23	1998	259
1973	23	1985	258
1996	23	1993	258
1977	22	1995	258
1987	22	1999	258
1978	21	2002	258
1982	21	1996	256
2001	21	2003	255
1969	20	1981	252
1986	20	1976	251
1999	20	1992	250
1967	19	2000	248
1981	19	**2008**	**245**
1988	19	1980	244
2008	**19**	1971	243
1994	18	1989	241
1995	18	1970	240
2003	18	1979	239
1975	17	1972	238
1979	17	1977	238
1985	17	2007	237
1998	17	1975	235
2005	17	1991	234
1983	16	1983	233
1990	16	2005	231
1991	16	1974	229
1992	16	1982	229
1971	15	2006	227
2007	15	1978	224
1989	14	1969	218
1970	13	2004	208
2006	13	1973	200

MONTHLY RANKING BY DRIEST MONTH

AMOUNT (mm)		AMOUNT % OF NORMAL	
March	2.4	May	9.9
February	3.7	March	14.8
May	4.4	February	27.8
November	6.4	September	37.4
January	9.7	November	43.2
September	11.0	January	53.3
December	15.0	December	82.0
April	23.0	August	91.7
August	33.2	April	97.5
October	47.0	June	131.1
June	78.0	July	137.9
July	80.0	October	286.6

PRECIPITATION

2008 PRECIPITATION RECORDS

TYPE	DATE	NEW RECORD	OLD RECORD/year
Greatest Daily Precipitation (mm)	August 13	9.2	8.4 / 1995
	August 26	17.2	9.4 / 1994
	October 5	17.4	4.3 / 1967
	October 8	11.4	6.6 / 1975
	October 14	13.2	7.8 / 1980
Least Monthly Precipitation (mm)	March	2.4	3.0 / 1994 & 1995
Monthly Precipitation Days Greater than 10 mm	October	3	3 / 1959

EXTREME PRECIPITATION EVENTS (mm)*

PERIOD	DATE	AMOUNT
0.5 hour	July 19	15.0
0.5 hour	June 26	10.6
1 hour	**July 19**	**22.4**
1 hour	**June 26**	**14.0**
2 hours	July 19	24.0
2 hours	June 26	19.6
6 hours	**July 19**	**24.0**
6 hours	**June 26**	**20.6**
12 hours	July 19	24.0
12 hours	June 26	20.6
Daily	**July 19**	**29.2**
Daily	**June 26**	**21.0**
More than one day	July 18 - 19	35.2
More than one day	June 25 - 27	30.0
Longest wet spell	**December 5 - 14**	**10 days / 8.5 mm**
Longest wet spell	**January 27 - February 1**	**6 days / 6.5 mm**
Longest wet spell	**July 5 - 10**	**6 days / 24.6 mm**
Longest dry spell	February 15 to March 4	19 days

*recorded by tipping bucket rain gauge since October 31, otherwise by the Belfort weigh gauge

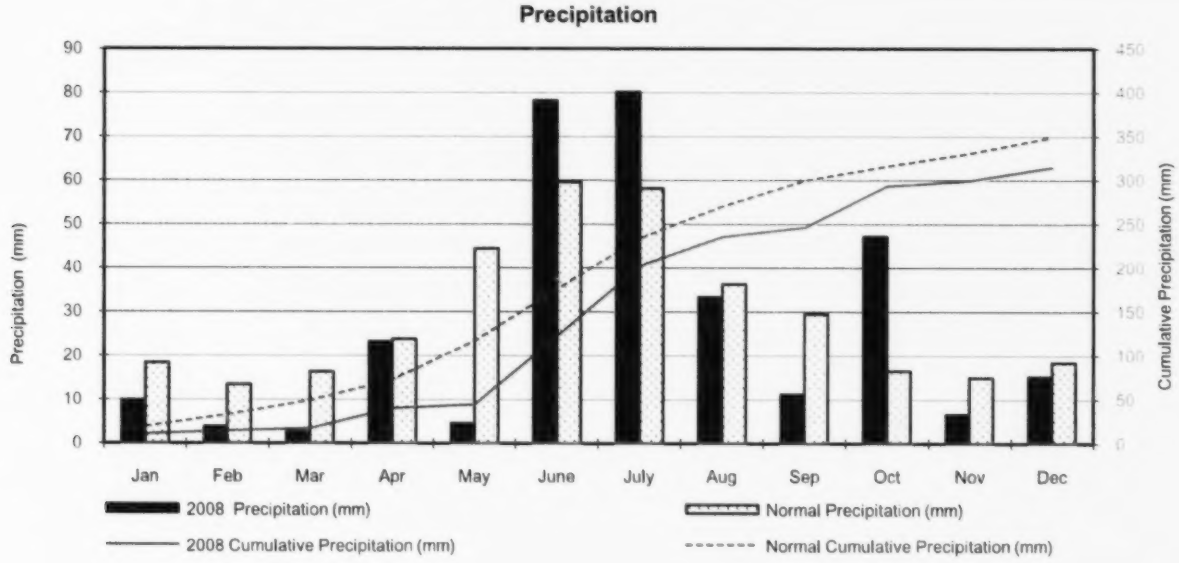
God made rainy days, so gardeners could get the housework done.
Unknown

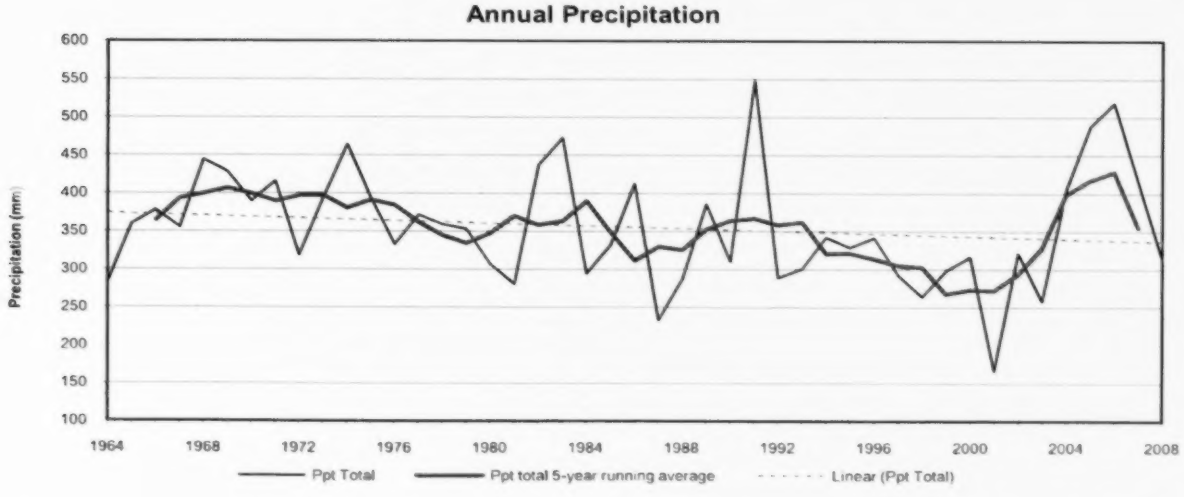
Thirty days hath September
April June and November
From January up to May
The rain it raineth every day
All the rest have thirty one
Without a blessed skean of sun
And if any of them had two and thirty
They'd be just as wet and twice as dirty
Unknown

PRECIPITATION

MONTH	MONTHLY PRECIPITATION (mm)				EXTREME VALUES (mm)	
	2008	NORMAL	CUMULATIVE 2008	% OF CUMULATIVE NORMAL	CRS	SASKATOON CITY
January	9.7	18.2	9.7	53.3	48.6 / 1969	66.1 / 1911 / SE
February	3.7	13.3	13.4	42.5	40.2 / 1979	43.7 / 1924 / SE
March	2.4	16.2	15.8	33.1	57.1 / 1967	59.0 / 1927 / SE
April	23.0	23.6	38.8	54.4	55.9 / 1985	86.1 / 1955 / US
May	4.4	44.3	43.2	37.4	145.3 / 1977	178.0 / 1977 / SWT
June	78.0	59.5	121.2	69.2	171.0 / 2005	166.6 / 1942 / S
July	80.0	58.0	201.2	86.3	125.9 / 1971	162.9 / 1928 / SE
August	33.2	36.2	234.4	87.0	105.2 / 2007	178.9 / 1954 / NRC
September	11.0	29.4	245.4	82.2	128.4 / 2006	128.4 / 2006 / SRC
October	47.0	16.4	292.4	92.8	69.8 / 1969	69.8 / 1969 / SRC
November	6.4	14.8	298.8	90.6	48.2 / 1973	57.3 / 1940 / SE
December	15.0	18.3	313.8	90.1	43.0 / 1977	59.2 / 1956 / SA
Total	313.8	348.2				

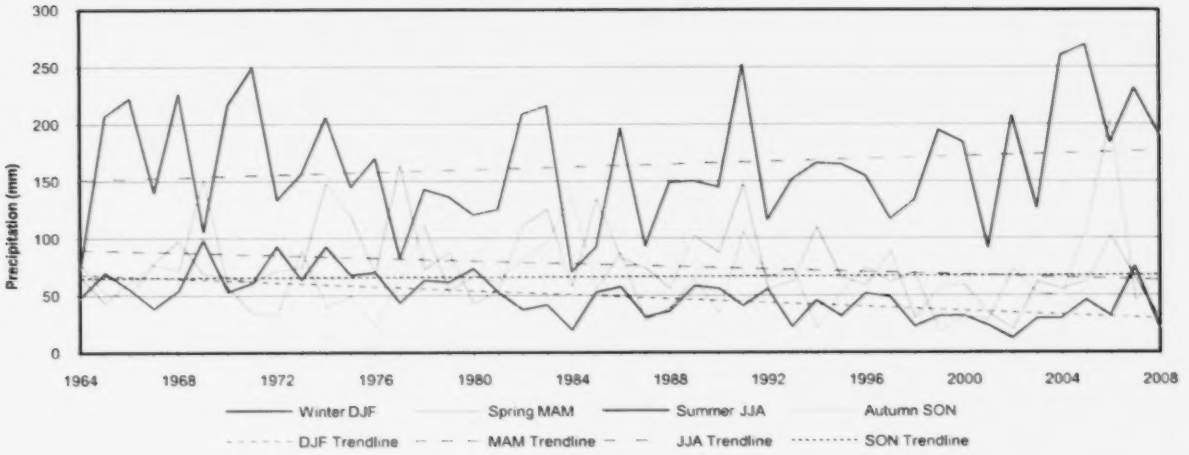
SE	Saskatoon Eby	1901 - 1942
US	University of Saskatchewan	1915 - 1964
SWT	Saskatoon Water Treatment Plant	1974 -
S	Saskatoon	1941 - 1942
NRC	National Res. Council	1952 - 1966
SRC	Sask. Res. Council	1963 -
SA	Saskatoon Diefenbaker International Airport	1942 -



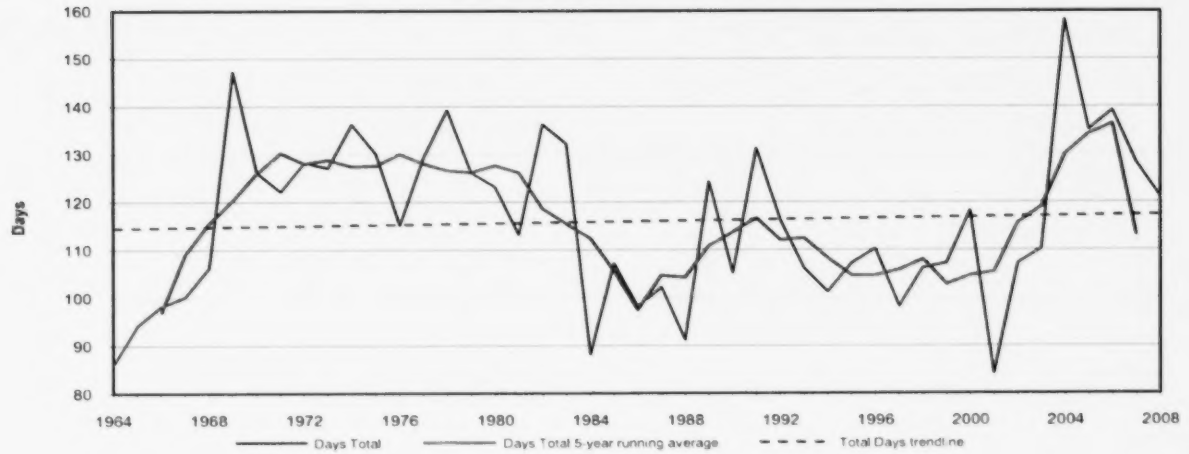


PRECIPITATION

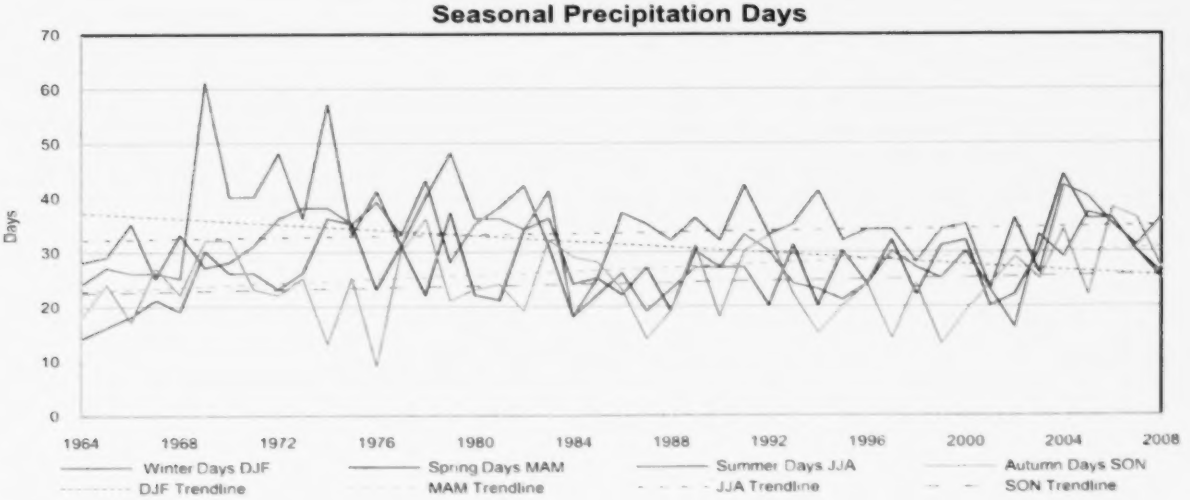
Seasonal Precipitation



Annual Precipitation Days

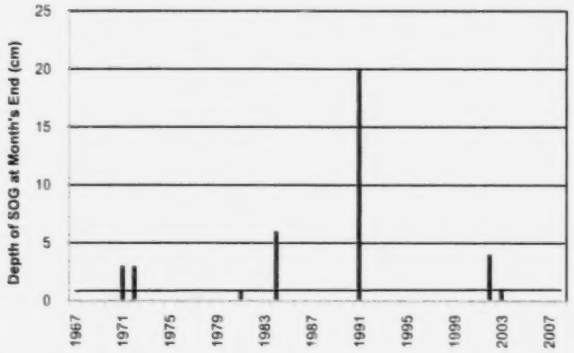


Seasonal Precipitation Days

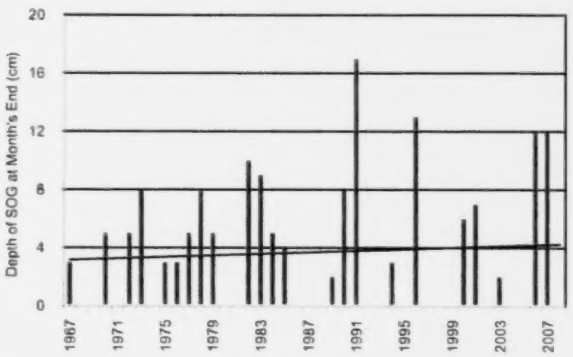


SNOW-ON-THE-GROUND (SOG)

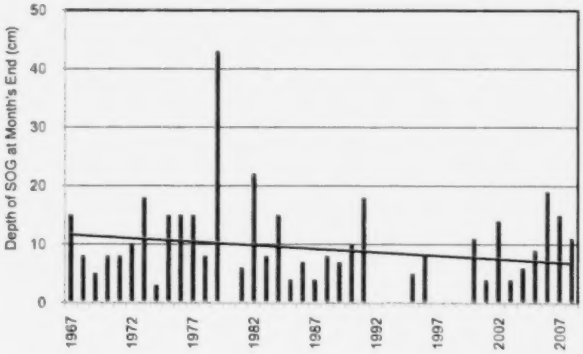
October



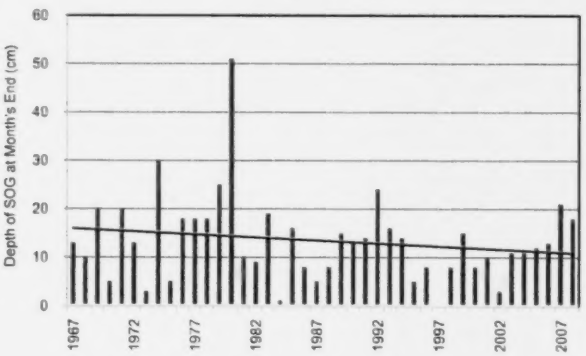
November



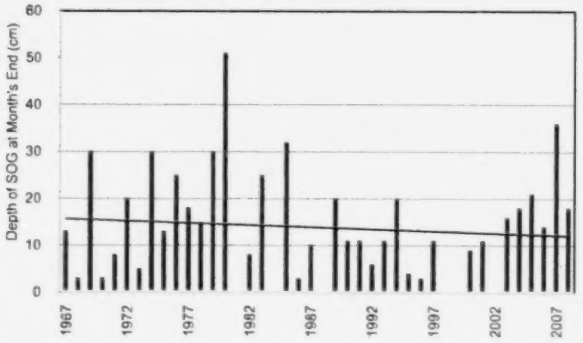
December



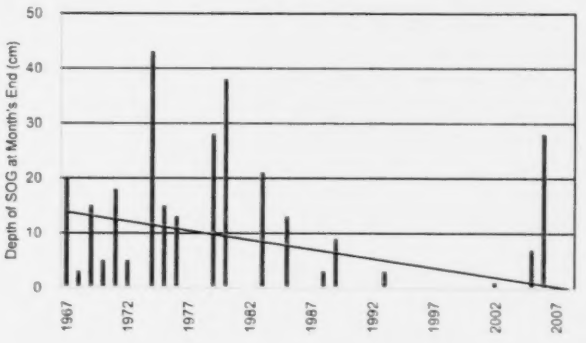
January



February



March



When there's snow on the ground, I like to pretend I'm walking on clouds.

Animal Crossing: Wild World by Takashi Tezuka, Aya Nishida and Toshihiro Kawahara

[1]QuotationPage.com 2007

RADIATION

Sunrise/Sunset Tables for Saskatoon, 2008 & 2009[1]

2008	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
Date	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
1	9:15	17:05	8:47	17:53	7:51	18:47	6:40	19:42	5:35	20:33	4:51	21:18	4:51	21:30	5:29	20:56	6:19	19:53	7:08	18:43	8:03	17:37	8:54	16:58
2	9:15	17:06	8:46	17:55	7:49	18:49	6:38	19:43	5:33	20:35	4:51	21:19	4:51	21:30	5:30	20:54	6:21	19:50	7:10	18:40	8:05	17:35	8:55	16:57
3	9:15	17:07	8:44	17:57	7:47	18:51	6:35	19:45	5:32	20:36	4:50	21:20	4:52	21:29	5:32	20:52	6:22	19:48	7:12	18:38	8:06	17:33	8:56	16:57
4	9:15	17:08	8:43	17:59	7:44	18:53	6:33	19:47	5:30	20:38	4:49	21:21	4:53	21:29	5:33	20:51	6:24	19:46	7:13	18:36	8:08	17:31	8:58	16:56
5	9:15	17:09	8:41	18:01	7:42	18:54	6:31	19:49	5:28	20:40	4:49	21:22	4:54	21:28	5:35	20:49	6:25	19:43	7:15	18:33	8:10	17:30	8:59	16:56
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7	9:14	17:12	8:37	18:05	7:38	18:58	6:26	19:52	5:24	20:43	4:48	21:24	4:56	21:27	5:38	20:45	6:29	19:39	7:19	18:29	8:14	17:26	9:01	16:55
8	9:13	17:13	8:36	18:06	7:35	19:00	6:24	19:54	5:23	20:45	4:47	21:25	4:57	21:26	5:40	20:43	6:30	19:37	7:20	18:27	8:15	17:25	9:03	16:55
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16	9:08	17:25	8:21	18:21	7:17	19:14	6:06	20:07	5:10	20:57	4:45	21:30	5:06	21:19	5:53	20:28	6:43	19:18	7:34	18:09	8:30	17:13	9:10	16:55
17	9:07	17:27	8:19	18:23	7:15	19:16	6:04	20:09	5:08	20:59	4:45	21:30	5:07	21:18	5:54	20:25	6:45	19:15	7:36	18:07	8:31	17:11	9:11	16:55
18	9:06	17:28	8:17	18:25	7:12	19:17	6:02	20:11	5:07	21:00	4:45	21:30	5:08	21:16	5:56	20:23	6:47	19:13	7:38	18:05	8:33	17:10	9:12	16:55
19	9:05	17:30	8:14	18:27	7:10	19:19	6:00	20:13	5:06	21:02	4:45	21:31	5:10	21:15	5:58	20:21	6:48	19:11	7:39	18:03	8:35	17:09	9:12	16:56
20	9:04	17:32	8:12	18:29	7:08	19:21	5:58	20:14	5:04	21:03	4:46	21:31	5:11	21:14	5:59	20:19	6:50	19:08	7:41	18:00	8:37	17:08	9:13	16:56
21	9:02	17:34	8:10	18:31	7:05	19:23	5:55	20:16	5:03	21:04	4:46	21:31	5:12	21:13	6:01	20:17	6:52	19:06	7:43	17:58	8:38	17:07	9:13	16:57
22	9:01	17:35	8:08	18:33	7:03	19:24	5:53	20:18	5:02	21:06	4:46	21:31	5:14	21:11	6:02	20:15	6:53	19:04	7:45	17:56	8:40	17:05	9:14	16:57
23	9:00	17:37	8:06	18:34	7:01	19:26	5:51	20:19	5:00	21:07	4:46	21:31	5:15	21:10	6:04	20:13	6:55	19:01	7:47	17:54	8:41	17:04	9:14	16:58
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25	8:58	17:41	8:02	18:38	6:56	19:30	5:47	20:23	4:58	21:10	4:47	21:31	5:18	21:07	6:07	20:08	6:58	18:57	7:50	17:50	8:45	17:02	9:15	16:59
26	8:56	17:42	8:00	18:40	6:54	19:31	5:45	20:25	4:57	21:11	4:48	21:31	5:20	21:06	6:09	20:06	7:00	18:54	7:52	17:48	8:46	17:02	9:15	17:00
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29	8:52	17:48	7:53	18:45	6:47	19:36	5:39	20:30	4:54	21:15	4:49	21:31	5:24	21:01	6:14	19:59	7:05	18:47	7:57	17:42	8:51	16:59	9:15	17:03
30	8:50	17:50			6:44	19:38	5:37	20:31	4:53	21:16	4:50	21:30	5:26	20:59	6:16	19:57	7:07	18:45	7:59	17:41	8:52	16:58	9:15	17:04
31	8:49	17:51			6:42	19:40			4:52	21:17			5:27	20:58	6:17	19:55			8:01	17:39			9:15	17:05

2009	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
Date	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
1	9:15	17:06	8:46	17:55	7:52	18:47	6:40	19:41	5:36	20:33	4:52	21:18	4:50	21:30	5:28	20:56	6:18	19:53	7:08	18:43	8:02	17:37	8:53	16:58
2	9:15	17:07	8:45	17:57	7:49	18:49	6:38	19:43	5:34	20:34	4:51	21:19	4:51	21:30	5:30	20:55	6:20	19:51	7:10	18:41	8:04	17:35	8:55	16:57
3	9:15	17:08	8:43	17:58	7:47	18:50	6:36	19:45	5:32	20:36	4:50	21:20	4:52	21:29	5:31	20:53	6:22	19:49	7:11	18:39	8:06	17:34	8:56	16:57
4	9:15	17:09	8:41	18:00	7:45	18:52	6:34	19:46	5:30	20:38	4:49	21:21	4:53	21:29	5:33	20:51	6:23	19:46	7:13	18:36	8:08	17:32	8:57	16:56
5	9:14	17:10	8:40	18:02	7:43	18:54	6:31	19:48	5:28	20:39	4:49	21:22	4:54	21:28	5:35	20:49	6:25	19:44	7:15	18:34	8:10	17:30	8:59	16:56
6	9:14	17:12	8:38	18:04	7:40	18:56	6:29	19:50	5:26	20:41	4:48	21:23	4:55	21:28	5:36	20:48	6:27	19:42	7:16	18:32	8:11	17:28	9:00	16:55
7	9:13	17:13	8:36	18:06	7:38	18:58	6:27	19:52	5:25	20:43	4:48	21:24	4:55	21:27	5:38	20:46	6:28	19:39	7:18	18:29	8:13	17:27	9:01	16:55
8	9:13	17:14	8:34	18:08	7:36	18:59	6:24	19:53	5:23	20:44	4:47	21:25	4:56	21:26	5:39	20:44	6:30	19:37	7:20	18:27	8:15	17:25	9:02	16:55
9	9:12	17:16	8:32	18:10	7:34	19:01	6:22	19:55	5:21	20:46	4:47	21:25	4:57	21:26	5:41	20:42	6:32	19:35	7:22	18:25	8:17	17:23	9:03	16:55
10	9:12	17:17	8:31	18:12	7:31	19:03	6:20	19:57	5:20	20:47	4:46	21:26	4:59	21:25	5:43	20:40	6:33	19:32	7:23	18:23	8:19	17:22	9:05	16:54
11	9:11	17:19	8:29	18:13	7:29	19:05	6:18	19:58	5:18	20:49	4:46	21:27	5:00	21:24	5:44	20:38	6:35	19:30	7:25	18:20	8:20	17:20	9:06	16:54
12	9:10	17:20	8:27	18:15	7:27	19:06	6:15	20:00	5:16	20:51	4:46	21:28	5:01	21:23	5:46	20:36	6:37	19:28	7:27	18:18	8:22	17:19	9:07	16:54
13	9:10	17:22	8:25	18:17	7:24	19:08	6:13	20:02	5:15	20:52	4:46	21:28	5:02	21:22	5:47	20:34	6:38	19:25	7:28	18:16	8:24	17:17	9:07	16:54
14	9:09	17:23	8:23	18:19	7:22	19:10	6:11	20:04	5:13	20:54	4:45	21:29	5:03	21:21	5:49	20:32	6:40	19:23	7:30	18:14	8:26	17:16	9:08	16:54
15	9:08	17:25	8:21	18:21	7:20	19:12	6:09	20:05	5:12	20:55	4:45	21:29	5:04	21:20	5:51	20:30	6:41	19:21	7:32	18:12	8:28	17:14	9:09	16:54
16	9:07	17:26	8:19	18:23	7:18	19:14	6:07	20:07	5:10	20:57	4:45	21:30	5:06	21:19	5:52	20:28	6:43	19:18	7:34	18:10	8:29	17:13	9:10	16:55
17	9:06	17:28	8:17	18:25	7:15	19:15	6:04	20:09	5:09	20:58	4:45	21:30	5:07	21:18	5:54	20:26	6:45	19:16	7:35	18:07	8:31	17:12	9:11	16:55
18	9:05	17:30	8:15	18:27	7:13	19:17	6:02	20:10	5:07	21:00	4:45	21:30	5:08	21:17	5:56	20:24	6:46	19:14	7:37	18:05	8:33	17:10	9:11	16:55
19	9:04	17:31	8:13	18:28	7:11	19:19	6:00	20:12	5:06	21:01	4:45	21:31	5:09	21:15	5:57	20:22	6:48	19:11	7:39	18:03	8:34	17:09	9:12	16:56
20	9:03	17:33	8:11	18:30	7:08	19:20	5:58	20:14	5:04	21:03	4:45	21:31	5:11	21:14	5:59	20:20	6:50	19:09	7:41	18:01	8:36	17:08	9:13	16:56
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23	8:59	17:38	8:05	18:36	7:01	19:26	5:52	20:19	5:01	21:07	4:46	21:31	5:15	21:10	6:04	20:13	6:55	19:02	7:46	17:55	8:41	17:05	9:14	16:58
24	8:58	17:40	8:02	18:38	6:59	19:27	5:50	20:21	4:59	21:08	4:47	21:31	5:16	21:09	6:05	20:11	6:56	19:00	7:48	17:53	8:43	17:04	9:14	16:58
25	8:57	17:42	8:00	18:40	6:57	19:29	5:48	20:22	4:58	21:10	4:47	21:31	5:18	21:07	6:07	20:09	6:58	18:57	7:50	17:51	8:44	17:03	9:15	16:59
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29	8:51	17:49			6:47	19:36	5:40	20:29	4:54	21:15	4:49	21:31	5:24	21:01	6:14	20:00	7:05	18:48	7:57	17:43	8:50	16:59	9:15	17:02
30	8:49	17:51			6:45	19:38	5:38	20:31	4:53	21:16	4:50	21:30	5:25	21:00	6:15	19:58	7:06	18:46	7:59	17:41	8:52	16:59	9:15	17:03
31	8:48	17:53			6:43	19:40			4:52	21:17			5:27	20:58	6:17	19:55			8:01	17:39			9:15	17:04

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[1] Sunrise/set corresponds to the upper limb of the sun appearing at the horizon

RADIATION

Bright Sunshine Rankings

% OF ACTUAL TO POSSIBLE BRIGHT SUNSHINE

% Annual		% Winter (DJF)		% Spring (MAM)		% Summer (JJA)		% Autumn (SON)	
1976	58.8	1980	55.0	1980	66.7	1969	70.7	1976	60.3
1980	58.3	2000	52.8	1968	63.0	1967	69.8	2008	57.3
2008	58.1	2007	50.9	2008	62.2	1978	69.2	1966	53.3
1978	57.2	1979	47.9	1976	62.1	1979	67.9	2001	52.9
2007	57.0	2001	47.8	1971	60.1	1984	67.9	1974	52.2
1979	56.8	1996	47.7	1969	59.2	1974	67.7	2007	52.1
1971	56.3	2002	47.1	1977	58.8	1970	67.5	2005	52.1
1967	56.0	1982	46.6	2002	58.6	2006	66.1	1979	51.3
2006	55.7	1978	46.4	1998	58.6	1975	65.6	1994	51.1
2001	55.7	1976	46.0	2007	58.6	1971	65.6	2000	50.3
1977	55.4	1989	45.8	1989	57.6	1982	65.4	1967	50.2
1969	55.3	1971	45.2	1981	57.6	1985	64.8	1982	50.0
1975	55.0	1966	45.1	2006	57.4	2007	64.7	1988	49.3
1968	54.2	1977	45.0	2001	56.9	1976	64.2	1978	49.1
1970	53.9	1984	44.9	1994	56.6	1983	64.2	2003	49.1
1981	53.8	1988	44.8	1966	55.7	1977	63.8	1975	48.9
1974	53.8	1970	44.6	1972	55.4	1968	63.3	1990	48.7
1966	53.5	2008	43.5	1967	54.4	1972	63.3	2006	48.5
1989	53.1	1993	43.4	1970	53.6	1981	63.1	1973	48.3
1988	53.0	1975	42.4	1979	53.4	2008	62.9	1980	47.7
1982	52.8	1981	42.2	1985	53.4	1980	62.0	1977	47.6
2003	52.1	2003	41.6	2003	53.3	1991	61.9	1997	47.5
2002	51.6	1973	41.2	1975	53.1	1988	61.8	2004	47.4
1984	51.6	1991	40.2	1978	53.0	1973	61.1	1989	46.5
1990	51.0	1995	40.2	2005	52.4	2001	59.2	1971	46.2
1973	51.0	1990	39.7	1991	51.7	1996	58.7	1995	45.8
1985	50.5	1987	38.9	1988	51.6	1966	58.7	1987	45.5
1991	50.5	1999	38.5	1992	51.5	1986	58.2	1999	44.2
2000	50.0	1968	38.0	1973	50.8	1989	58.1	2002	44.1
1972	49.8	2005	37.9	1983	50.1	1990	58.0	1968	44.0
1997	49.6	2006	37.1	1990	49.8	1997	57.7	1993	43.8
1994	49.6	1997	37.0	1997	49.3	2003	57.4	1981	43.1
2005	49.1	1967	36.5	1974	49.0	2002	53.8	1969	42.9
1983	48.9	1972	36.3	2004	48.7	1999	52.2	1983	41.5
1996	47.9	2004	35.9	1982	48.3	2000	52.1	1991	40.4
1999	46.5	1992	35.9	1993	48.2	1994	51.0	1970	40.2
1995	46.5	1986	35.6	2000	48.1	1995	50.5	1985	39.3
1986	46.0	1985	35.1	1995	47.6	2004	48.5	1998	38.9
1998	46.0	1969	34.0	1984	47.0	2005	48.5	1984	38.1
1987	45.1	1998	33.7	1987	46.8	1992	48.4	1996	37.7
1993	44.9	1974	32.2	1999	45.2	1987	46.3	1986	36.4
2004	44.8	1994	26.9	1986	44.7	1998	45.8	1992	35.3
1992	43.8	1983	24.2	1996	44.1	1993	44.9	1972	33.6

DAYS WITH BRIGHT SUNSHINE

Annual		Winter (DJF)		Spring (MAM)		Summer (JJA)		Autumn (SON)	
1979	337	2007	80	1994	89	1977	92	1979	86
1976	335	1972	79	2002	89	1982	92	1999	86
1978	335	1984	79	2008	89	1997	92	1976	84
2008	333	1979	78	1969	88	2001	92	2003	84
1980	331	1982	78	1997	88	1969	91	1987	83
1990	331	1993	78	1998	88	1970	91	1990	82
2001	331	1966	77	1980	87	1976	91	2008	82
2007	328	1988	77	1985	87	1978	91	1968	81
1997	327	2000	77	2000	87	1979	91	2005	81
1999	327	1976	76	1968	86	1989	91	1978	80
1977	325	1980	76	1971	86	1967	90	1966	79
1988	325	1977	74	1972	86	1971	90	1967	79
1970	324	1978	74	1984	86	1980	90	1974	79
1994	324	1990	74	1988	86	1983	90	1977	79
1968	323	2008	74	1992	86	1985	90	1985	79
1985	323	1991	73	2004	86	2007	90	1988	79
1989	323	1970	72	2007	86	1972	89	1993	79
1993	323	1971	72	1976	85	1974	89	2004	79
1996	323	1996	72	1978	85	1981	89	1980	78
2003	322	1973	71	2001	85	1986	89	1975	77
1971	321	1987	71	1966	84	1987	89	1991	77
1987	321	1989	71	1970	84	1994	89	1994	77
2000	321	2001	71	1981	84	1999	89	1997	77
2005	321	2002	71	1990	84	2003	89	2000	77
1966	320	1999	70	1996	84	1966	88	1996	76
1975	319	1975	69	2005	84	1968	88	2001	76
1982	319	1997	69	1967	83	1984	88	2007	76
2002	319	1998	68	1973	83	1988	88	1982	75
1967	318	1974	68	1975	83	1995	88	1989	75
1969	318	1985	68	1979	83	1990	88	2002	75
1972	316	1995	68	1989	83	2000	88	1973	74
1974	315	2003	68	1993	83	2006	88	1971	73
1991	315	1969	67	1977	82	2008	88	1983	73
1981	313	1981	67	1986	82	1975	87	1995	73
1984	312	2005	67	1991	82	1990	87	1970	72
1973	311	1992	65	1999	82	1991	87	1981	72
1998	310	2006	64	1982	81	1993	87	1998	72
2006	308	1967	63	1995	81	1998	87	1969	71
1986	307	2004	63	2006	81	1973	86	1986	71
1983	305	1986	62	1983	80	2002	85	2006	70
1995	303	1996	62	1974	79	2005	84	1992	66
2004	301	1994	60	2003	79	1992	83	1972	64
1992	300	1983	55	1987	77	2004	81	1984	64

RADIATION

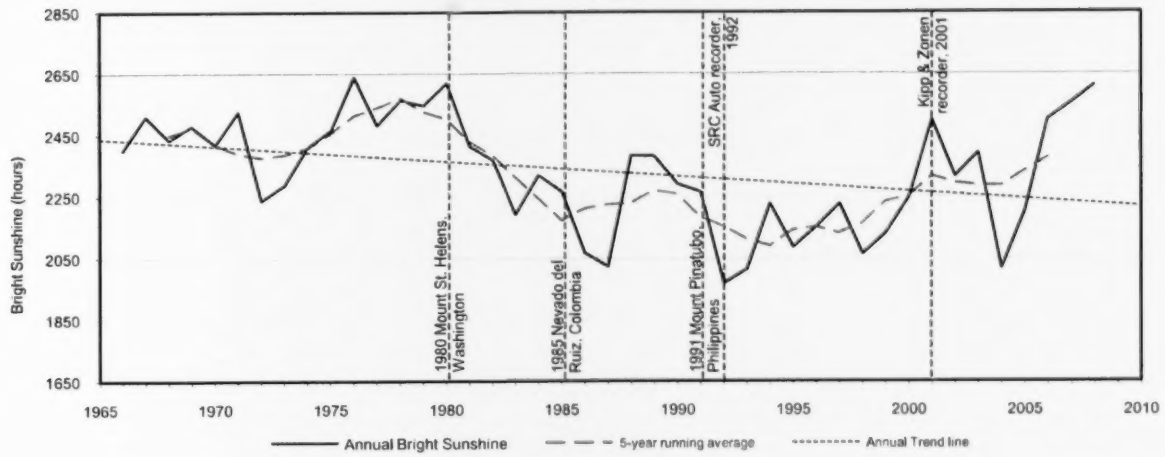
MONTH	BRIGHT SUNSHINE (hrs)				BRIGHT SUNSHINE DAYS		
	2008	NORMAL	% OF NORMAL	% OF POSSIBLE	ANY DAY	DAYS GREATER THAN 1 HOUR	NORMAL FOR ANY DAY
January	105.6	103.3	102.2	40.8	24	20	23.8
February	153.2	132.3	115.8	53.0	27	25	24.2
March	223.9	175.2	127.8	60.4	29	28	27.1
April	233.2	225.2	103.6	55.6	29	27	27.3
May	338.5	267.1	126.7	69.3	31	31	29.5
June	286.1	277.2	103.2	57.2	25	27	28.5
July	317.3	305.7	103.8	63.3	31	31	30.3
August	310.7	280.8	110.6	68.8	29	29	30.1
September	259.6	186.0	139.6	68.7	29	29	27.0
October	199.4	157.9	126.3	60.8	28	26	27.0
November	96.5	98.0	98.5	36.6	25	18	22.2
December	85.9	85.4	100.6	35.5	23	17	22.8
Total	2609.9	2294.1	113.8	58.1	333	308	319.8

Global and Diffuse Radiation

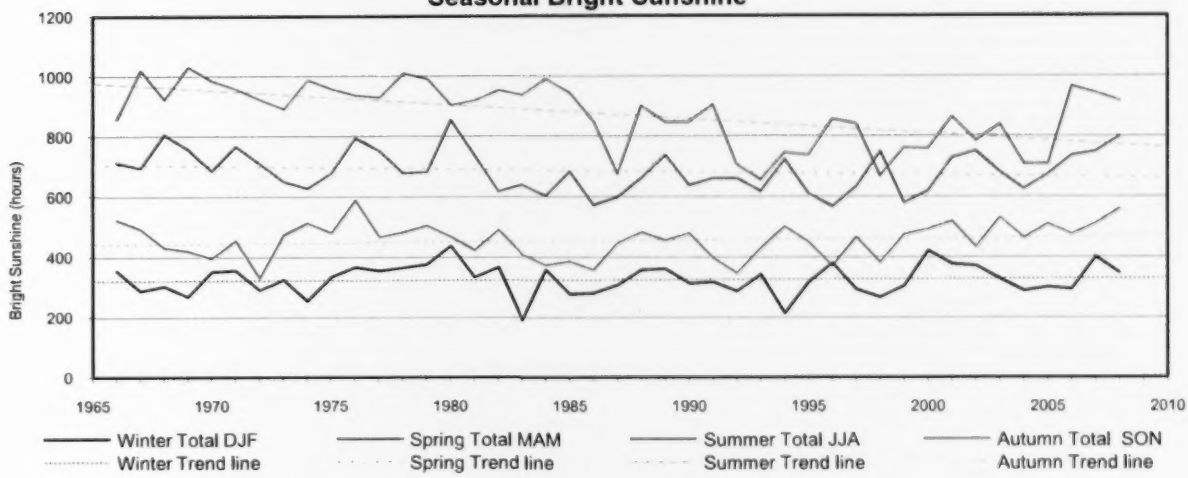
DATE	JAN		FEB		MAR		APR		MAY		JUN		JULY		AUG		SEPT		OCT		NOV		DEC	
	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D
1	3.3	1.9	4.9	3.5	9.1	4.9	19.5	3.0	20.5	6.6	29.3	3.2	27.7	5.4	24.4	3.5	6.6	6.1	13.2	1.7	6.3	1.6	1.3	1.3
2	2.1	2.1	5.1	4.7	12.3	2.4	18.3	3.6	25.9	4.1	19.7	10.4	20.9	9.5	23.6	5.1	14.5	6.4	12.7	1.8	5.6	3.0	3.4	1.3
3	3.1	1.5	6.1	3.6	8.5	7.6	12.4	7.3	25.2	4.6	23.3	8.5	25.7	6.2	20.3	7.4	14.7	6.5	12.9	1.8	1.7	1.7	2.4	2.1
4	3.8	1.1	9.6	2.4	12.7	4.0	11.3	8.0	24.0	7.8	18.7	5.9	26.3	7.7	22.3	6.8	13.4	6.6	11.2	3.0	4.0	2.0	2.2	2.1
5	3.4	1.3	10.1	2.1	11.9	6.0	19.1	5.0	22.5	7.5	28.5	6.2	23.6	8.7	20.1	5.9	15.2	4.9	1.1	1.1	2.8	2.7	1.1	1.1
6	2.0	2.1	6.7	2.1	15.1	2.7	13.6	8.3	19.6	10.1	20.9	12.4	18.1	10.2	25.3	2.9	11.2	6.3	2.9	2.4	2.3	2.3	2.1	1.9
7	3.3	2.1	6.5	3.5	11.0	4.3	17.4	6.2	26.1	4.3	7.9	7.0	12.5	8.0	22.9	4.6	11.0	8.1	5.4	4.3	2.7	2.7	3.4	1.2
8	4.8	1.6	3.6	3.5	13.5	2.0	16.4	5.7	23.3	9.8	11.6	8.8	19.4	10.8	23.5	3.3	17.4	3.9	2.3	2.0	4.6	2.9	1.8	1.8
9	4.0	2.4	8.1	1.6	14.3	1.9	15.9	7.3	23.5	8.9	13.9	9.3	21.0	6.5	18.2	7.1	11.0	8.1	2.7	2.7	1.9	1.8	3.3	2.0
10	2.9	2.1	4.5	4.2	13.6	3.6	6.1	5.2	25.0	5.5	20.3	9.5	15.1	7.7	20.6	4.9	8.4	6.5	4.3	3.9	5.7	1.4	3.5	1.2
11	2.2	2.2	5.4	4.5	6.6	6.3	15.8	6.4	16.7	12.1	12.9	10.0	18.8	10.7	17.1	6.6	17.5	3.4	5.7	4.5	1.2	1.2	1.9	1.9
12	3.2	1.9	7.3	4.5	14.6	3.1	22.0	2.5	23.1	9.5	4.9	4.5	26.2	6.1	11.4	8.2	15.3	4.9	11.9	3.0	0.9	0.9	1.3	1.3
13	3.0	2.9	5.7	5.0	11.2	4.8	18.8	6.6	23.1	6.8	18.1	12.3	23.0	6.0	11.2	7.2	17.5	2.6	10.3	2.0	2.2	2.1	2.4	2.2
14	3.3	3.1	5.0	4.8	16.0	3.9	11.7	9.2	19.6	9.3	12.4	8.2	18.4	6.0	19.2	6.7	16.5	4.0	3.8	2.5	2.6	2.1	3.9	1.8
15	2.5	2.4	5.7	5.1	14.6	3.0	18.1	7.1	23.2	8.1	24.1	10.9	23.2	8.5	22.5	3.1	16.0	2.3	10.5	1.8	2.5	2.1	4.6	1.7
16	4.9	2.2	8.2	3.9	7.4	5.8	18.7	8.0	26.5	4.7	24.9	5.0	19.3	9.8	22.4	4.1	15.5	3.6	9.9	1.7	1.9	1.8	4.3	1.2
17	5.1	1.5	9.5	1.9	9.5	6.1	20.5	5.4	24.0	7.4	27.9	4.3	20.8	6.3	22.0	3.7	14.6	4.1	9.8	2.4	4.0	2.3	2.8	2.1
18	3.4	3.2	6.2	5.8	14.8	3.5	19.3	6.3	13.6	10.7	29.4	4.4	17.6	9.3	21.7	4.0	15.8	2.8	2.1	2.0	2.8	2.5	2.8	1.9
19	6.8	1.5	7.2	6.1	15.1	4.5	16.8	12.4	24.6	7.8	23.3	7.9	16.1	9.1	21.3	3.9	12.7	6.9	9.3	2.3	2.2	2.1	1.7	1.5
20	3.8	3.1	9.5	2.3	4.9	4.1	4.3	3.8	14.1	11.1	28.7	4.3	27.1	2.9	17.9	5.6	14.3	3.7	7.7	4.4	2.8	2.6	2.2	2.2
21	5.0	2.3	10.5	2.7	3.9	3.9	10.8	9.1	16.0	10.6	27.4	6.0	27.2	2.7	18.2	7.7	13.6	4.7	4.1	3.4	3.7	2.5	5.0	1.2
22	3.4	3.1	10.9	2.8	13.2	6.8	14.5	10.4	27.8	5.3	19.0	7.5	12.9	9.5	11.3	10.7	4.1	2.6	9.1	1.5	3.8	2.4	3.9	1.6
23	6.6	1.5	11.3	3.3	16.2	3.9	20.1	8.9	27.8	4.3	27.5	7.0	10.9	7.9	21.8	21.4	14.6	2.5	5.3	3.4	4.8	1.1	4.7	1.2
24	2.2	2.2	9.7	4.2	8.3	6.2	14.9	11.0	22.0	8.7	13.5	8.7	21.0	10.8	20.8	20.4	14.9	3.4	5.8	3.9	4.3	1.6	5.8	1.2
25	5.2	2.4	8.2	4.8	14.7	6.4	8.2	6.8	11.2	9.0	24.5	7.2	26.3	3.3	15.9	15.3	13.1	3.6	6.6	2.8	3.8	1.1	2.2	2.1
26	5.0	3.5	9.2	5.2	17.2	3.6	22.0	5.3	29.1	3.9	22.8	7.9	28.0	4.3	3.1	3.0	14.3	2.0	8.4	1.7	2.9	1.5	2.9	1.8
27	3.0	3.0	7.9	6.9	17.3	3.8	24.7	4.8	29.5	3.3	5.0	4.9	17.6	7.0	16.8	13.6	9.5	5.0	8.2	1.5	4.1	1.1	3.7	2.7
28	3.3	3.3	11.2	3.0	12.5	8.7	17.6	10.5	28.8	4.9	28.1	4.7	17.2	9.5	16.2	4.8	10.3	4.8	7.6	1.5	3.5	1.6	2.5	2.5
29	6.9	1.5	13.2	5.8	8.4	7.0	24.3	4.8	17.0	9.8	29.6	2.8	21.4	7.5	20.7	3.4	13.7	2.0	7.0	2.1	3.4	1.2	3.7	1.7
30	7.0	1.5			19.2	3.2	5.4	5.1	23.1	8.9	27.7	5.0	21.6	7.9	20.7	2.3	13.4	1.9	7.3	1.6	3.6	1.5	3.4	2.2
31	5.4	3.5			8.9	7.3			20.2	5.7			25.1	3.3	4.3	4.2			7.5	2.0			1.2	1.2
[illegible]																								
[illegible]																								

RADIATION

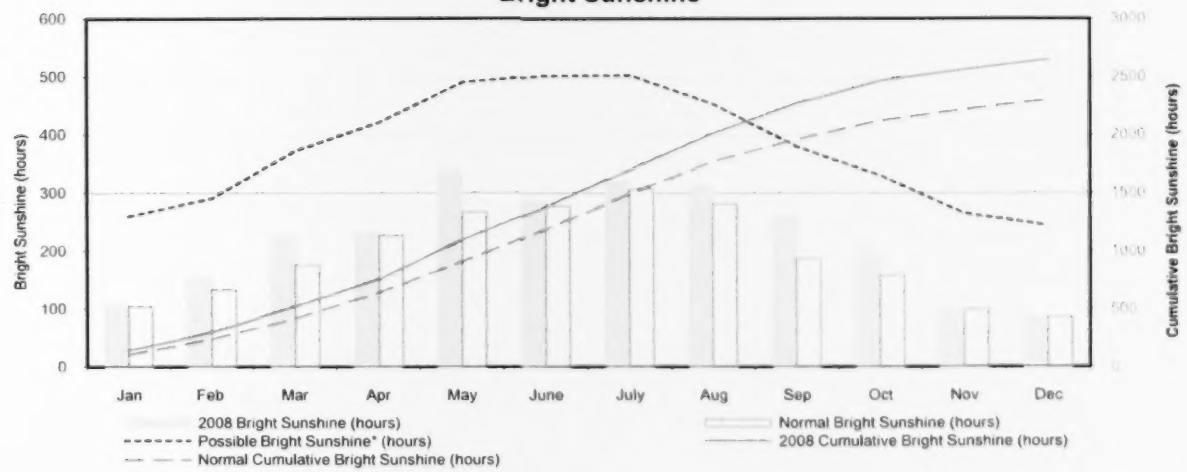
Annual Bright Sunshine



Seasonal Bright Sunshine

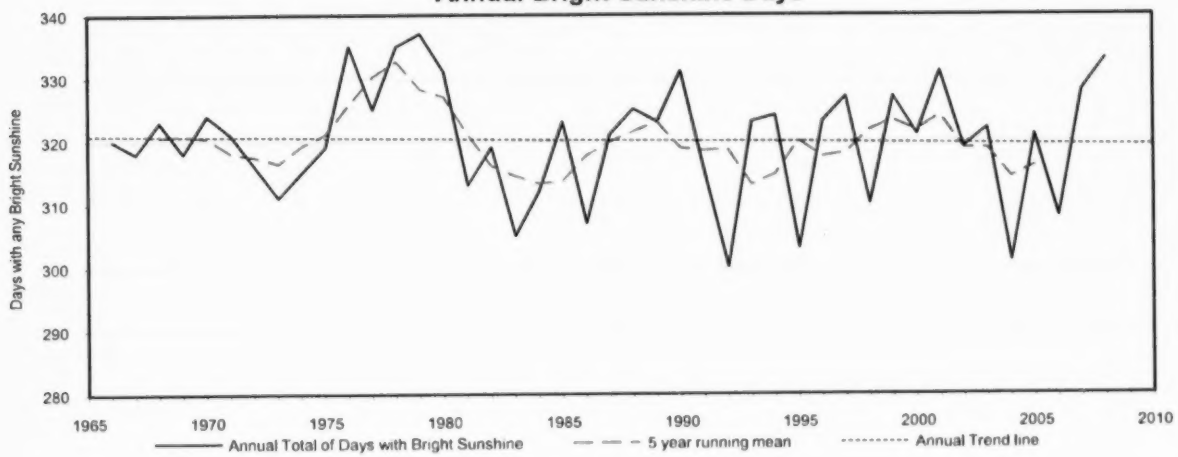


Bright Sunshine

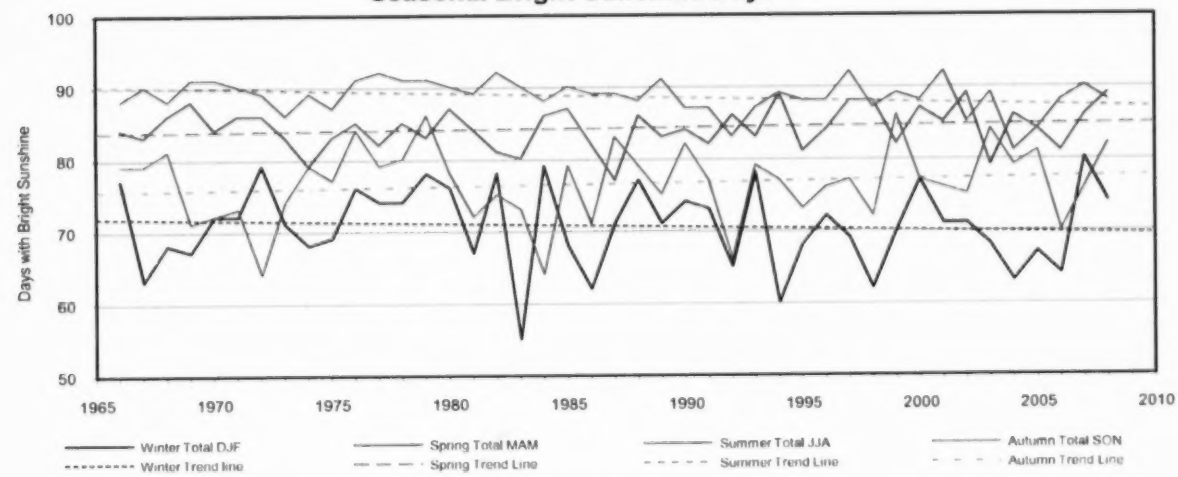


RADIATION

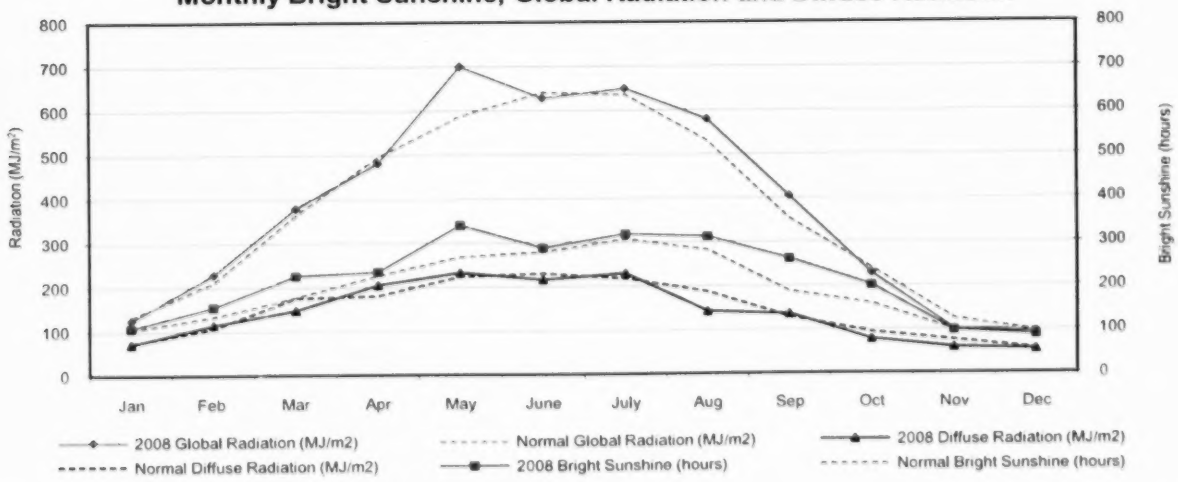
Annual Bright Sunshine Days



Seasonal Bright Sunshine Days



Monthly Bright Sunshine, Global Radiation and Diffuse Radiation



WIND

EXTREME DAILY WINDS FOR 2008 (km/h)

DATE	WIND SPEED/ DIRECTION	BEAUFORT WIND SCALE DESIGNATION*
January 2	54.1 S	Near Gale
January 15	63.9 NNW	Gale
January 27	53.3 NE	Near Gale
January 28	53.2 NNE	Near Gale
February 6	68.6 NW	Gale
February 28	57.7 SE	Near Gale
March 2	60.5 NW	Near Gale
April 18	62.2 NNE	Gale
April 20	54.6 NE	Near Gale
April 21	72.7 WSW	Gale
April 22	66.8 WSW	Gale
April 29	51.4 ESE	Near Gale
April 30	51.7 E	Near Gale
May 16	66.8 WNW	Gale
May 21	52.9 ESE	Near Gale
May 23	55.1 E	Near Gale
May 30	53.6 NNW	Near Gale
May 31	56.7 WNW	Near Gale
June 4	52.1 NE	Near Gale
June 7	59.4 NE	Near Gale
June 11	55.5 E	Near Gale
June 12	67.3 NNE	Gale
June 26	63.3 NW	Gale
June 27	54.1 N	Near Gale
June 30	78.0 SW	Strong Gale
July 5	57.7 SW	Near Gale
July 11	62.7 WNW	Gale
July 27	82.5 W	Strong Gale
July 30	62.7 W	Gale
July 31	57.2 W	Near Gale
August 19	52.4 SSE	Near Gale
August 26	56.9 NW	Near Gale
August 28	56.9 WNW	Near Gale
September 15	55.4 WSW	Near Gale
September 23	51.6 WNW	Near Gale
September 27	54.2 SSE	Near Gale
September 28	56.0 WNW	Near Gale
October 4	54.8 SE	Near Gale
October 5	53.4 SE	Near Gale
October 6	53.4 WNW	Near Gale
October 8	66.3 WNW	Gale
October 20	56.7 SSE	Near Gale
October 21	54.1 NW	Near Gale
October 25	75.0 NW	Gale
October 26	62.9 NW	Gale
November 9	54.0 SE	Near Gale
November 22	60.3 W	Near Gale
November 23	54.9 WNW	Near Gale
December 1	74.4 WNW	Gale
December 2	79.2 NW	Near Gale
December 31	56.7 ESE	Near Gale

*Near Gale >=51 but <63 *Gale >=63 but <76
*Strong Gale >=76 but <88 *Storm >=88 but <102

WINDCHILL CALCULATION CHART [1]

T°C Speed km/h	5°	0°	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°	-45°	-50°
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
20	1	-5	-12	-18	-24	-31	-37	-43	-49	-56	-62	-68
25	1	-6	-12	-19	-25	-32	-38	-45	-51	-57	-64	-70
30	0	-7	-13	-20	-26	-33	-39	-46	-52	-59	-65	-72
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-74
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-75
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-70	-76
55	-2	-9	-15	-22	-29	-36	-43	-50	-57	-63	-70	-77
60	-2	-9	-16	-23	-30	-37	-43	-50	-57	-64	-71	-78
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-2	-9	-16	-23	-30	-37	-44	-51	-59	-66	-73	-80
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

Approximate Thresholds	
-28	Increasing risk of frostbite for most people within 30 minutes of exposure
-36	High risk for most people in 5 to 10 minutes of exposure
-48	High risk for most people in 2 to 5 minutes of exposure
-55	High risk for most people in 2 minutes of exposure or less

1 Environment Canada, 2004b

DAILY WIND CHILL VALUE WHEN BELOW 0°C

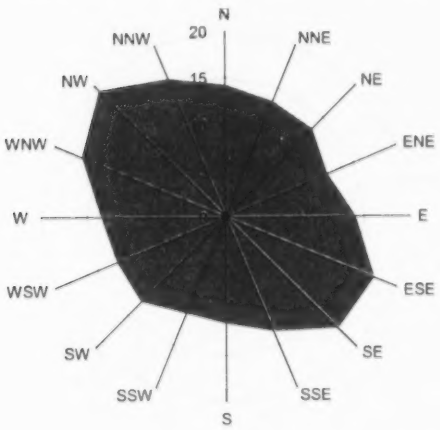
DATE	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC
1	-31.2	-37.1	-15.3	-14.4	-2.1	0.0	0.0	0.0	0.0	0.0	-3.3	-11.4
2	-27.3	-29.1	-31.6	-10.6	-6.2	0.0	0.0	0.0	0.0	0.0	-6.7	-14.4
3	-10.8	-34.2	-28.3	-6.8	-1.2	0.0	0.0	0.0	0.0	0.0	0.0	-22.8
4	-12.2	-31.6	-25.0	-13.5	-4.0	0.0	0.0	0.0	0.0	0.0	-1.0	-23.3
5	-7.5	-31.2	-28.8	-16.2	-0.1	0.0	0.0	0.0	0.0	0.0	-6.6	-18.6
6	-13.0	-26.1	-33.1	-10.2	-1.2	0.0	0.0	0.0	0.0	0.0	-9.0	-23.8
7	-19.4	-30.1	-24.9	-10.4	-7.1	0.0	0.0	0.0	0.0	-2.5	-12.4	-24.4
8	-25.4	-39.3	-13.7	-9.1	-5.3	0.0	0.0	0.0	0.0	-0.7	-14.0	-21.7
9	-26.8	-45.9	-13.2	-7.8	-8.1	0.0	0.0	0.0	0.0	-2.0	-13.0	-29.0
10	-24.9	-45.8	-7.3	-4.1	-5.7	0.0	0.0	0.0	0.0	-2.4	-10.6	-23.3
11	-20.5	-35.8	-5.9	-4.6	0.0	0.0	0.0	0.0	0.0	-6.4	-9.1	-24.3
12	-18.2	-29.6	-5.4	-6.9	-2.9	0.0	0.0	0.0	0.0	-6.3	-5.4	-26.8
13	-20.7	-37.7	-11.3	0.0	0.0	0.0	0.0	0.0	0.0	-8.1	-8.4	-42.7
14	-20.5	-36.6	-12.6	0.0	0.0	0.0	0.0	0.0	0.0	-2.9	-8.5	-44.2
15	-27.9	-30.5	-14.7	-2.1	0.0	0.0	0.0	0.0	0.0	-6.6	-11.6	-42.2
16	-32.3	-10.0	-19.5	-5.6	0.0	0.0	0.0	0.0	0.0	-2.9	-6.8	-33.8
17	-32.1	-28.8	-21.9	-4.1	0.0	0.0	0.0	0.0	0.0	-6.0	-15.3	-36.3
18	-36.8	-30.1	-12.0	-9.2	0.0	0.0	0.0	0.0	0.0	-2.0	-8.6	-34.2
19	-30.7	-34.2	-11.2	-14.0	0.0	0.0	0.0	0.0	0.0	-5.5	-14.3	-35.0
20	-36.5	-36.5	-8.2	-10.6	0.0	0.0	0.0	0.0	0.0	-7.2	-22.0	-40.3
21	-29.0	-25.6	-7.5	-17.8	0.0	0.0	0.0	0.0	0.0	0.0	-21.5	-42.9
22	-27.5	-21.4	-14.1	-18.4	0.0	0.0	0.0	0.0	0.0	-6.0	-16.0	-43.7
23	-33.5	-19.5	-14.2	-14.2	0.0	0.0	0.0	0.0	0.0	-2.5	-9.1	-41.0
24	-26.3	-18.5	-8.4	-9.1	0.0	0.0	0.0	0.0	-0.9	-6.9	-14.0	-32.8
25	-23.4	-14.2	-12.7	-7.5	0.0	0.0	0.0	0.0	-0.9	-7.6	-7.3	-36.0
26	-25.1	-18.4	-17.8	-10.0	-4.6	0.0	0.0	0.0	-4.5	-11.2	-10.2	-34.1
27	-26.3	-15.9	-15.2	-6.1	0.0	0.0	0.0	0.0	0.0	-14.2	-12.9	-37.6
28	-44.5	-15.7	-13.2	-5.1	0.0	0.0	0.0	0.0	0.0	-5.6	-15.1	-28.0
29	-49.4	-21.5	-12.4	-1.6	0.0	0.0	0.0	0.0	-1.9	-0.4	-12.7	-37.9
30	-42.0		-15.6	0.0	0.0	0.0	0.0	0.0	0.0	-2.6	-15.1	-42.2
31	-41.8		-11.9		0.0		0.0	0.0		-2.6		-35.8

WIND

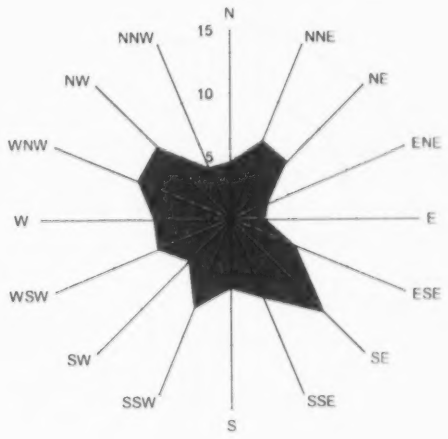
MONTH	AVERAGE WIND SPEED (km/h)			HIGHEST INSTANTANEOUS WIND SPEED (km/h)							
	2008 Average	Normal*	2008 Peak Speed Average	2008 for CRS (Speed / direction / date)			Since 1953 (Saskatoon Diefenbaker Int'l. Airport) (Speed / direction / day / year)			
January	14.1	16	33.2	63.9	NNW	15	111	W	11	1986
February	13.1	16	32.5	68.6	NW	06	106	N	22	1988
March	14.3	17	33.3	60.5	NW	02	93	W	18	1959
April	16.9	18	41.3	72.7	WSW	21	108	W	06	1959
May	15.8	18	41.7	66.8	WNW	16	132	SW	17	1965
June	12.9	17	42.0	78.0	SW	30	117	S	01	1986
July	12.9	16	37.9	82.5	W	27	113	E	05	1955
August	15.9	16	40.6	56.9	WNW	28	151	W	14	1967
September	13.8	17	38.3	56.0	WNW	28	148	W	22	1967
October	17.1	17	41.8	75.0	NW	25	138	NW	16	1967
November	14.7	16	37.1	60.3	W	22	100	W	17	1967
December	13.5	16	33.9	79.2	NW	02	121	W	12	1955

*1961-90 Normals used are from the Environment Canada Saskatoon Diefenbaker International Airport station: 1993

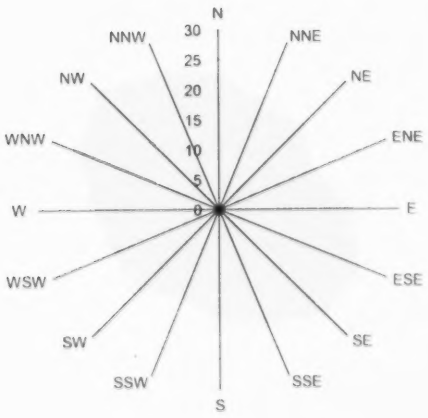
Wind Speed Average by Direction (km/h)



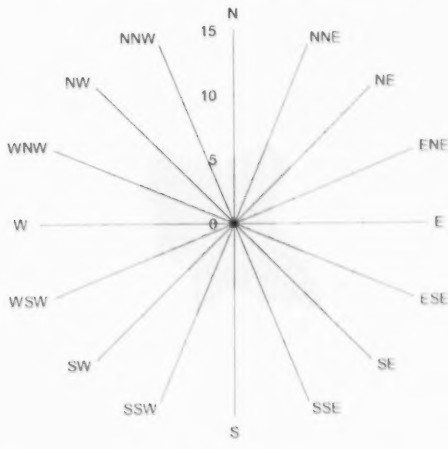
Wind Frequency by Direction (%)



Peak Wind Speed Average by Direction (km/h)



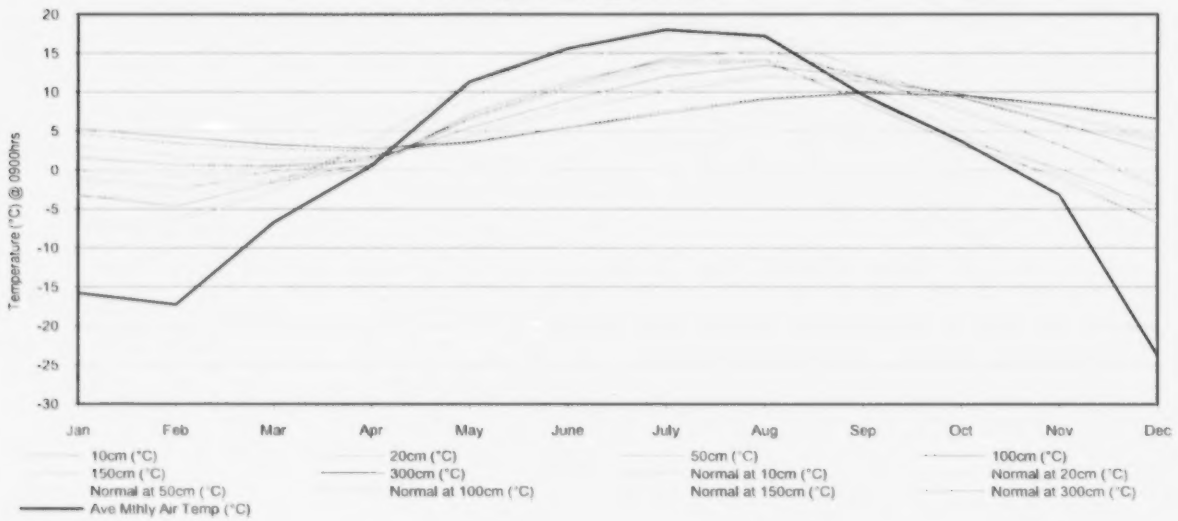
Peak Wind Frequency by Direction (%)



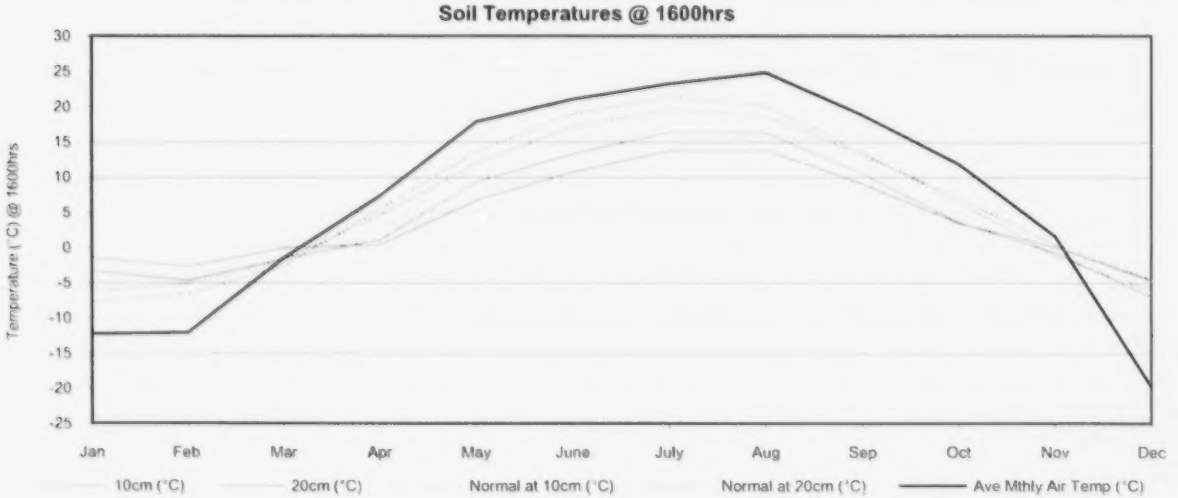
SOIL TEMPERATURES

MONTH	Mean Air Temp @ 0900h (°C)	SOIL TEMPERATURES (C°) @ 0900hrs												Mean Air Temp @ 1600h (°C)	SOIL TEMPERATURES @ 1600hrs			
		10cm		20cm		50cm		100cm		150cm		300cm			10cm		20cm	
		2008	NORM	2008	NORM	2008	NORM	2008	NORM	2008	NORM	2008	NORM		2008	NORM	2008	NORM
January	-15.8	-9.3	-8.0	-11.5	-7.1	-11.0	-9.5	1.5	-0.1	3.0	1.7	5.2	4.6	-12.3	-9.4	-7.8	-11.5	-6.2
February	-17.3	-4.7	-6.7	-2.7	-5.1	-2.2	-3.5	0.6	-0.8	1.8	0.8	4.2	3.4	-12.1	-4.7	-6.6	-2.7	-5.2
March	-6.8	-1.6	-2.8	-0.1	-2.4	-1.2	-1.5	0.4	-0.4	1.2	0.6	3.2	2.7	-1.5	-1.6	-2.6	-0.1	-1.8
April	0.5	0.3	3.6	0.4	4.0	0.7	3.0	1.2	1.6	1.7	1.5	2.7	2.4	7.3	1.1	5.5	0.4	4.6
May	11.3	7.2	10.8	6.6	11.3	6.8	9.3	5.4	6.4	4.3	4.8	3.5	3.4	17.8	9.3	13.6	6.7	12.0
June	15.6	11.3	15.7	10.7	16.3	10.9	14.0	9.0	10.4	7.6	8.3	5.4	5.4	21.0	13.3	19.0	10.7	17.1
July	18.0	14.0	18.0	13.7	18.9	14.3	16.7	12.0	13.1	10.1	10.9	7.2	7.5	23.2	16.3	21.3	13.7	19.5
August	17.2	14.1	16.9	13.8	18.1	15.4	16.8	13.4	14.1	11.9	12.3	9.0	9.1	24.8	16.2	20.0	13.8	18.6
September	9.6	8.5	11.0	9.1	12.5	11.9	13.2	11.9	12.4	11.3	11.7	9.8	9.9	16.8	10.4	13.4	9.0	13.1
October	3.7	3.1	4.7	3.8	6.2	7.5	8.3	9.3	9.2	9.7	9.6	9.5	9.4	11.8	3.5	6.4	3.4	6.9
November	-3.2	-1.0	-1.7	0.1	-0.5	3.2	3.0	5.9	5.6	7.0	6.8	8.3	8.1	1.6	-0.8	-1.2	0.0	0.3
December	-23.6	-7.0	-6.6	-4.7	-5.6	-2.3	-1.7	2.3	2.0	4.2	3.8	6.5	6.4	-19.5	-7.1	-6.3	-4.8	-4.6

Soil Temperatures @ 0900 hrs



Soil Temperatures @ 1600hrs



Saskatchewan Research Council

Annual Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

		2008 VALUE	2007 VALUE	NORMAL (1971-2000) OR EXTREME (1892-2004)
TEMPERATURE	Average annual maximum (°C)	8.5	8.6	8.3
	Extreme annual maximum (°C/date)	37.9 August 19	37.1 July 23	41.0 June 1988
	Average annual minimum (°C)	-3.3	-2.2	-3.4
	Extreme annual minimum (°C/date)	-36.9 December 22	-31.1 February 12&14	-50.0 Feb. 1893
	Annual **average** (°C)	2.6	3.2	2.5
	No.of Frost-free days (Temperature > 0°C)	165	189	197.1
DEGREE-DAYS	Annual growing (5°C base)	1741.3	1778.1	1672.9
	Annual frost-free growing (5°C base)	1440.6	1454.4	1691.0
	Annual heating (18°C base)	5745.8	5529.5	5808.8
	Annual cooling (18°C base)	134.2	173.4	119.1
PRECIPITATION	Annual total (mm)	313.8	413.9	348.2
	Greatest Daily (mm/date)	29.2 July 19	68.0 June 17	99.4 June 24, 1983
	Greatest Monthly (mm/date)	80.0 July	109.4 June	160.1/June 1991
	Measurable precipitation days (≥ 0.2mm)	121	128	115.7
WIND	Average Annual wind speed (km/h)	14.6	14.7	16.6*
	Peak gust (speed/direction/date)	82.5^July 27	82.3^July21	151.0 ^Aug 14, 1967*
RADIATION	Total annual bright sunshine (hours)	2609.9	2553.2	2294.1
	% possible bright sunshine	58.1	57.0	51.2
	% normal bright sunshine	113.8	111.3	
	Bright Sunshine days	333	328	319.9
	% of normal Bright Sunshine days	74.2	102.6	
	Total annual global radiation(MJ/m^2)	4574.0	4536.1	4391.9**
	Total annual diffuse radiation (MJ/m^2)	1670.5	1677.0	1729.6**

For Your Information

Normal and Extreme Values

The 1971-2000 normals for CRS have been calculated from original data entered on computerized spreadsheets and checked for correctness. Where suitable, missing data has been replaced with data from the University of Saskatchewan, Kernen Farm station (2.5 km E of CRS) and the Saskatoon Diefenbaker International Airport (DIA) station (10 km WNW of CRS). Wind normals marked with '*' are from the Saskatoon DIA station. Global and Diffuse radiation normals are from 1961-1990 period and are marked with'**'. Extreme values are from the Saskatoon area weather stations extending back to 1882. The earlier records from 1882 to 1901 have several large gaps.

Data for the wind roses have been compiled using Mistaya's "Windographer™"

Ministry of Energy and Resources
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Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

January 2008		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-9.3	-6.3	-11.6	
	Extreme monthly maximum (°C/date)	5.7/15	5.2/02	7.0/1986/11&1993/30	11.0/1980/23 SWT
	Average monthly **minimum** (°C)	-19.4	-15.9	-21.8	
	Extreme monthly minimum (°C/date)	-36.1/29	-31.2/12	-43.9/1966/22&1969/29	-48.9/1893/31 SM
	Monthly **average** (°C)	-14.3	-11.1	-16.7	
	No.of Frost-free days (Temp. > 0°C)	0	1	0	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	0.0	0.0	
	Yearly total-to-date growing	0.0	0.0	0.0	
	Monthly heating (18°C base)	1003.1	903.0	1076.9	
	Yearly total-to-date heating	1003.1	903.0	1076.9	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	0.0	0.0	0.0	
PRECIPITATION	Monthly total (mm)	9.7	45.7	18.2	66.1/1911 SE
	Yearly total-to-date (mm)	9.7	45.7	18.2	
	Greatest daily (mm/date)	4.5/28	35.2/10	15.4/1989/30	30.5/1893/23 SM
	Measurable precipitation days (≥ 0.2mm)	9	10	11.3	
WIND	Average monthly speed (km/h)	14.1	15.9	16.0 SA	
	Peak gust (speed/direction/date)	63.9 NNW 15	73.6 NE 10		111 W 1986/11 SA
RADIATION	Monthly bright sunshine (hours)	105.6	140.7	103.3	
	% possible bright sunshine	40.8	54.3	39.8	
	% normal bright sunshine	102.2	136.2		
	Bright Sunshine days	24	29	23.8	
	Monthly global radiation(MJ/m²)	123.9	132.8	129.9	
	Monthly diffuse radiation (MJ/m²)	70.2	63.6	71.4	
SOIL	Average temperature (°C) @ 9:00am grass level	-2.6	3.3		
	10 cm/20 cm	-3.3/-1.5	-0.9/0.4	-8.0/-7.1	
	50 cm/100cm	-1.0/1.5	0.2/2.3	-3.5/-0.1	
	150 cm/300cm	3.0/5.2	3.3/5.0	1.7/4.6	

Saskatoon Stations
SM=Interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
SWT= S'toon Water Treatment Plant 1974-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

The start of January 2008 saw above 0°C temperatures for three days. The daily mean temperatures remained above seasonal until about the 18th when they began to dip down to -20°C. A short reprieve followed and then on the 27th the temperatures began to slide downwards until the minimum temperature hit below -36°C on January 29th. As the wind gusts ranged from 53.3 km/h on the 27th to 29.9 km/h on the 30th, the wind chill index was very high. A small amount of rain, which quickly changed to snow, was observed on the 15th when the monthly extreme maximum temperature of 5.7°C occurred. High winds rekindled fears of blizzard conditions like those experienced last year. Unlike last year when 36 cm of snow were recorded, this year's "blizzard" had only 1.1 cm. Twenty-four days recorded a total slightly above the average bright sunshine for the month.

Although really cold weather usually is a deterrent to crime, it was not the case last year in Winnipeg on a bitterly cold January night. Two thugs fired a shotgun at two pedestrians after demanding their money and other items. The would-be targets weren't hit and ran away after the shot. The bitter cold had prompted the would-be thieves to carry out their crime from the heated comfort of a vehicle.[1]

[1]Phillips 2007

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Monthly Weather Summary

smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

February 2008		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-10.0	-12.3	-7.7	
	Extreme monthly maximum (°C/date)	1.4/16	0.2/15	8.3/2005/02	12.8/1931/19$_{SE}$
	Average monthly **minimum** (°C)	-21.2	-21.1	-17.6	
	Extreme monthly minimum (°C/date)	-34.7/10	-31.1/12&14	-41.1/1972/06	-50.0/1893/01$_{SM}$
	Monthly **average** (°C)	-15.6	-16.7	-12.6	
	No. of Frost-free days (Temp. > 0°C)	0	0	0.2	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	0.0	0.0	
	Yearly total-to-date growing	0.0	0.0	0.0	
	Monthly heating (18°C base)	974.3	972.2	886.2	
	Yearly total-to-date heating	1977.4	1875.2	1963.1	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	0.0	0.0	0.0	
PRECIPITATION	Monthly total (mm)	3.7	19.0	13.3	43.7/1924$_{SE}$
	Yearly total-to-date (mm)	13.4	64.7	31.5	
	Greatest daily (mm/date)	1.4/13	6.7/23	14.2/1979/13	30.0/1962/03$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	6	10	8.9	
WIND	Average monthly speed (km/h)	13.1	12.0	16.0	
	Peak gust (speed/direction/date)	68.6^{NW}06	56.9^{N}01		106^{W}1988/22$_{SA}$
RADIATION	Monthly bright sunshine (hours)	153.2	132.7	132.3	
	% possible bright sunshine	53.0	47.6	47.4	
	% normal bright sunshine	115.8	100.3		
	Bright Sunshine days	27	24	24.2	
	Monthly global radiation(MJ/m^2)	227.0	216.5	210.1	
	Monthly diffuse radiation (MJ/m^2)	113.6	115.0	105.3	
SOIL	Average temperature (°C) @ 9:00am — grass level	-2.4	2.4		
	10 cm/20 cm	-4.7/-2.7	-1.6/-0.2	-6.7/-6.1	
	50 cm/100cm	-2.2/0.6	-0.4/1.4	-3.5/-0.8	
	150 cm/300cm	1.8/4.2	2.5/4.3	0.8/3.4	

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SA= Stoon Airport 1942-Present

For Your Information

If February felt long and cold:---it was! 2008 is a leap year and two-thirds of the daily average temperatures for February were below normal. It was not until the last nine days that the temperatures rose to seasonal. The bright sunshine was almost 16% above normal with nine days recording over 80% of the possible bright sunshine. Fortunately, bright sunshine was not available at noon on the 2nd. If Saskatoon had had a ground hog to forecast the remaining length of winter, he/she/it would have predicted an early spring. Snow fall, occurring on six days in the first half of the month, produced a monthly total of only 3.7cm. Snow accumulation on the ground was stable at 18cm. Soil temperatures at all levels are above normal for this time of year. So far this winter, the frost has not reach to the 100cm level at the station .

Between January 31st and February 9th, 1947 a blizzard hit the southern part of the province. All highways into Regina and towns were blocked and the railroads faired no better. One train was buried in a snow drift one kilometre long (30 football fields) and eight metres deep (height of a two story building). This had to be removed by volunteers using ordinary shovels.[1]

[1] Heldon 2007 Phillips 1993

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Monthly Weather Summary

smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

45 years CRS estab. 1963

March 2008

		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	0.1	1.5	-0.7	
	Extreme monthly maximum (°C/date)	6.3/23	12.2/23	20.0/1993/23	22.8/1910/23$_{SE}$
	Average monthly **minimum** (°C)	-10.0	-8.9	-10.5	
	Extreme monthly minimum (°C/date)	-27.6/06	-24.4/15	-38.9/1972/02	-43.3/1897/14$_{SM}$
	Monthly **average** (°C)	-5.0	-3.7	-5.6	
	No.of Frost-free days (Temp. > 0°C)	0	3	1.2	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	1.4	2.4	
	Yearly total-to-date growing	0.0	1.4	2.4	
	Monthly heating (18°C base)	712.5	673.9	732.4	
	Yearly total-to-date heating	2689.9	2549.1	2695.5	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	0.0	0.0	0.0	
PRECIPITATION	Monthly total (mm)	2.5	18.3	16.2	59.0/1927$_{SE}$
	Yearly total-to-date (mm)	15.8	83.0	47.7	
	Greatest daily (mm/date)	0.6/17&24	8.1/28	32.0/1967/30	32.0/1967/30$_{SRC}$
	Measurable precipitation days (≥ 0.2mm)	7	14	9.0	
WIND	Average monthly speed (km/h)	14.3	16.0	17.0	
	Peak gust (speed/direction/date)	60.5^{NNA}02	54.8^{E}27		93^{W}1959/18
RADIATION	Monthly bright sunshine (hours)	223.9	217.5	175.2	
	% possible bright sunshine	60.4	59.0	47.4	
	% normal bright sunshine	127.8	124.1		
	Bright Sunshine days	29	28	27.1	
	Monthly global radiation(MJ/m^2)	376.5	388.6	362.4	
	Monthly diffuse radiation (MJ/m^2)	146.3	167.0	173.9	
SOIL	Average temperature (°C) @ 9.00am — grass level	2.2	5.0		
	10 cm/20 cm	-1.6/-0.1	-0.7/-0.2	-2.8/-2.4	
	50 cm/100cm	-1.2/0.4	-0.5/0.9	-1.5/-0.4	
	150 cm/300cm	1.2/3.2	1.9/3.4	0.6/2.7	

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

March saw gophers popping up from their burrows and geese returning from their winter vacations. A record maximum daily temperature on the 1st preceded the last four minus double-digit temperatures of winter (hopefully). Overall, the monthly temperatures were within about 0.5°C of their normal values. Monthly precipitation was only 15% of normal with it falling as both rain and snow. The yearly cumulative precipitation is now a third of normal but still above the record drought year of 2001. Despite two days not recording any bright sunshine, the values were almost 28% above normal. Thirteen days recorded over 80% of the possible bright sunshine while seven days recorded over 90%. Wind values were in the *Near Gale* category on the 2nd but, for the rest of the month, were not a concern. The snow pack melt has been gradual with the snow-on-the-ground measurements reaching zero by March 13th.

March is usually a transition month from winter to spring as in the old proverb "March, black ram, Comes in like a lion and goes out like a lamb." Less familiar, stating the same sentiment, is the old Scottish saw "March comes in with adders' heads and goes out with peacocks' tails."[1]

[1]Inwards 1993

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Saskatchewan Research Council

Monthly Weather Summary

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latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

April 2008

		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	8.3	10.5	10.7	
	Extreme monthly maximum (°C/date)	24.8/13	22.7/28	31.5/2001/28	33.3/1952/28 SA US
	Average monthly **minimum** (°C)	-3.6	-0.4	-1.7	
	Extreme monthly minimum (°C/date)	-12.2/05	-13.4/06	-27.8/1979/01	-30.5/1979/01 SAT
	Monthly **average** (°C)	2.4	5.0	4.5	
	No. of Frost-free days (Temp. > 0°C)	5	16	10.6	
DEGREE-DAYS	Monthly growing (5°C base)	31.3	98.1	61.3	
	Yearly total-to-date growing	31.3	99.5	63.7	
	Monthly heating (18°C base)	469.1	388.7	420.7	
	Yearly total-to-date heating	3159.0	2937.8	3116.2	
	Monthly cooling (18°C base)	0.0	0.0	0.3	
	Yearly total-to-date cooling	0.0	0.0	0.3	
PRECIPITATION	Monthly total (mm)	23.0	2.4	23.6	86.1/1955 US
	Yearly total-to-date (mm)	38.8	85.4	71.3	
	Greatest daily (mm/date)	7.6/20	1.0/17&18	24.6/1985/19	30.2/1955/19 US
	Measurable precipitation days (≥ 0.2mm)	12	4	8.4	
WIND	Average monthly speed (km/h)	16.9	16.1	18.0	
	Peak gust (speed/direction/date)	72.7 WSW 21	59.4 ESE 19		108 W 1959/06
RADIATION	Monthly bright sunshine (hours)	233.2	262.1	225.2	
	% possible bright sunshine	55.6	62.7	53.8	
	% normal bright sunshine	103.6	116.4		
	Bright Sunshine days	29	29	27.3	
	Monthly global radiation(MJ/m²)	478.9	506.5	492.2	
	Monthly diffuse radiation (MJ/m²)	203.8	197.5	178.5	
SOIL	Average temperature (°C) @ 9:00am — grass level	9.2	11.2		
	10 cm/20 cm	0.3/0.4	1.5/1.3	3.6/4.0	
	50 cm/100cm	0.7/1.2	1.0/1.6	3.0/1.6	
	150 cm/300cm	1.7/2.7	2.0/3.0	1.5/2.4	

Saskatoon Stations
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SWT= S'toon Water Treatment Plant 1974-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

April expectations lean toward warmer temperatures and gentle rain showers to encourage the eagerly awaited spring May flowers. What happened was below normal temperatures and a spring blizzard. April began with temperatures climbing above normal and peaking with a maximum of 24.8°C on the 13th. Temperatures then fell until, on the 23rd, a minimum of -9.1°C was recorded. The average temperature on this date was 12°C below normal. Up until the 18th, only 4.6mm of precipitation had been recorded. Then rain mixed with snow sporadically fell. On the 20th, Saskatoon experienced a mild spring blizzard with 7.6cm of wet snow being recorded. Precipitation was only slightly below normal for the month. This is the 8th consecutive month of below normal precipitation. With the cool temperatures and snow, the soil temperatures, in the upper levels, are slow to warm this year.

Blizzards in April are not unusual. Winnipeg recorded a 1-day snowfall of 33cm on April 12, 1872 while La Ronge was buried under 48cm of snow on April 9, 1987. At least, this year, there have not been any reports of beer freezing in cellars as noted in the Hudson Bay, York Factory journals of 1757.[1]

Philips 1988

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Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

May 2008		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	18.9	18.3	18.6	
	Extreme monthly maximum (°C/date)	25.9/15	26.5/17	35.0/1988/30	37.2/1936/27 SE
	Average monthly **minimum** (°C)	4.0	5.5	4.7	
	Extreme monthly minimum (°C/date)	-3.8/02	-0.6/10	-10.0/1967/02	-12.8/1907/06 SE
	Monthly **average** (°C)	11.5	11.9	11.6	
	No.of Frost-free days (Temp. > 0°C)	24	30	25.6	
DEGREE-DAYS	Monthly growing (5°C base)	202.4	214.4	211.6	
	Yearly total-to-date growing	233.7	313.9	275.3	
	Monthly heating (18°C base)	203.9	189.4	204.4	
	Yearly total-to-date heating	3362.3	3127.2	3320.6	
	Monthly cooling (18°C base)	1.4	0.8	7.4	
	Yearly total-to-date cooling	1.4	0.8	7.7	
PRECIPITATION	Monthly total (mm)	4.4	44.0	44.3	178.0/1977 SWT
	Yearly total-to-date (mm)	42.3	129.4	115.6	
	Greatest daily (mm/date)	1.2/11&30	15.0/29	39.9/1985/04	59.0/1999/18 SA
	Measurable precipitation days (≥ 0.2mm)	6	12	9.8	
WIND	Average monthly speed (km/h)	15.8	17.1	18.0	
	Peak gust (speed/direction/date)	66.8 NW 16	71.2 NW 12		132 SW 1965/17 SA
RADIATION	Monthly bright sunshine (hours)	338.5	267.0	267.1	
	% possible bright sunshine	69.3	54.8	54.7	
	% normal bright sunshine	126.7	100.0		
	Bright Sunshine days	31	29	29.5	
	Monthly global radiation(MJ/m²)	697.6	587.7	586.3	
	Monthly diffuse radiation (MJ/m²)	231.3	213.0	222.2	
SOIL	Average temperature (°C) @ 9:00am — grass level	20.0	19.1		
	10 cm/20 cm	7.2/6.6	7.8/8.6	10.8/11.3	
	50 cm/100cm	6.8/5.4	8.0/6.5	9.3/6.4	
	150 cm/300cm	4.3/3.5	5.3/3.9	4.8/3.4	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
SWT= S'toon Water Treatment Plant 1974-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

The temperature ranged from a low of -3.8°C to a high of 25.9°C; almost 30°C difference. The month began with below normal temperatures. They were above by mid month and then oscillated between being above and below normal to finish the month. All this fluctuating resulted in monthly averages within 1°C of their respective monthly normals. The month was the second driest May ever recorded at CRS. Only May 2002 was drier with 0.2 mm. This is the 9th consecutive month of below normal precipitation. The cumulative moisture since January is only 2.1 mm more than the driest year 2001. In 2002, CRS had only measured 26.5 mm by this time of year but the remainder of 2002 made up for the record dry start. Not surprising, bright sunshine was over 26% more than normal, over 71 'extra' hours. Winds, although not really high, were constantly over 40 km/h for much of the latter part of the month. Frost occurred on May 26, hopefully to be the last until fall.

The Merry Month of May did not end so merry for Buffalo Gap residents. On May 30, 1961, more than 250 mm of rain, accompanied by golf ball sized hail, deluged the hamlet in less than an hour. The ground looked as if there had been a winter blizzard with four metres deep hailstone piles on the south sides of grain elevators. Ten days later, hailstones still lay under the rubble[1]. [1]Phillips 1993

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Monthly Weather Summary

smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

June 2008

		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	22.7	22.2	22.6	
	Extreme monthly maximum (°C/date)	34.7/30	29.5/02	41.0/1988/05	41.5/1988/06$_{S2}$
	Average monthly **minimum** (°C)	9.1	9.4	9.5	
	Extreme monthly minimum (°C/date)	3.2/09	2.7/07	-3.3/1967/06	-3.9/1917/02$_{US}$
	Monthly **average** (°C)	15.9	15.8	16.0	
	No. of Frost-free days (Temp. > 0°C)	30	30	29.9	
DEGREE-DAYS	Monthly growing (5°C base)	327.4	325.1	331.5	
	Yearly total-to-date growing	561.1	639.0	606.8	
	Monthly heating (18°C base)	77.7	77.0	82.8	
	Yearly total-to-date heating	3440.6	3204.2	3403.4	
	Monthly cooling (18°C base)	15.1	12.1	22.3	
	Yearly total-to-date cooling	16.5	12.9	30.0	
PRECIPITATION	Monthly total (mm)	78.0	109.4	59.5	186.8/1942$_{S}$
	Yearly total-to-date (mm)	121.2	238.8	175.1	
	Greatest daily (mm/date)	21.0/26	68.0/17	99.4/1983/24	99.4/1983/24$_{SRC}$
	Measurable precipitation days (≥ 0.2mm)	16	10	12.5	
WIND	Average monthly speed (km/h)	12.9	15.5	17.0	
	Peak gust (speed/direction/date)	78.0^{SW}30	72.7^{N}18		117^{S}1986/01$_{SA}$
RADIATION	Monthly bright sunshine (hours)	286.1	314.7	277.2	
	% possible bright sunshine	57.2	62.9	55.4	
	% normal bright sunshine	103.2	113.5		
	Bright Sunshine days	28	29	28.5	
	Monthly global radiation(MJ/m^2)	625.8	662.5	638.7	
	Monthly diffuse radiation (MJ/m^2)	214.7	226.7	228.1	
SOIL	Average temperature (°C) @ 9:00am grass level	23.6	23.1		
	10 cm/20 cm	11.3/10.7	11.8/12.4	15.7/16.3	
	50 cm/100cm	10.9/9.0	11.8/9.8	14.0/10.4	
	150 cm/300cm	7.6/5.4	8.2/5.8	8.3/5.4	

Saskatoon Stations
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-
S= Saskatoon 1941-42
S2=Saskatoon 2 1977-90

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

June redeemed May in the farmers' eyes with above average rainfall. Crops received much needed moisture and lawns and gardens also appreciated the 30% above normal precipitation. Although 16 days recorded rain, only two days did not record bright sunshine. The summer storms moved quickly over Saskatoon, deluging some areas and sprinkling others. Temperatures were seasonable with only one daily maximum temperature set on the 30th when the 1989 temperature of 34.0°C was replaced by a new record of 34.7°C. Strong winds were intermittent throughout the month with winds classified as 'strong gale' (76-87 km/h) occurring on the 30th and 'gale' (63-75 km/h) occurring on the 12th and 26th.

It's all in the timing! During the dry spring of 1958, the Stoney Indians west of Calgary told rain-desperate farmers that if the farmers donated to a "rain fund," the Stoneys would perform their traditional 4-day rain dance. If it rained during that time, the Stoney's would get the money, if it didn't the farmers would get their money back. For four days the Stoneys danced to no avail. A week later, 16.8mm of rain were recorded.[1] [1]Phillips, 2007

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Monthly Weather Summary

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CRS estab. 1963

July 2008		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	24.7	28.5	24.8	
	Extreme monthly maximum (°C/date)	34.0/04	37.1/23	39.3/ 2001/05	40.0/1919/17&1941/19&1946/30 SE/ES4
	Average monthly **minimum** (°C)	12.3	15.0	11.5	
	Extreme monthly minimum (°C/date)	7.7/02	8.7/10	1.7/1967/02&1978/09	-0.6/1918/25 SE
	Monthly **average** (°C)	18.6	21.8	18.2	
	No.of Frost-free days (Temp. > 0°C)	31	31	31	
DEGREE-DAYS	Monthly growing (5°C base)	420.7	519.5	408.4	
	Yearly total-to-date growing	981.8	1158.5	1015.2	
	Monthly heating (18°C base)	22.4	9.1	35.3	
	Yearly total-to-date heating	3463.0	3213.3	3438.7	
	Monthly cooling (18°C base)	40.1	125.6	40.7	
	Yearly total-to-date cooling	56.6	138.5	70.7	
PRECIPITATION	Monthly total (mm)	80.0	16.4	58.0	162.9/1928 SE
	Yearly total-to-date (mm)	201.2	255.2	233.1	
	Greatest daily (mm/date)	29.2/19	8.8/09	45.5/1968/29	79.2/1946/03 US
	Measurable precipitation days (≥ 0.2mm)	13	8	12.0	
WIND	Average monthly speed (km/h)	12.9	12.6	16.0	
	Peak gust (speed/direction/date)	82.5W27	82.3W21		113E1955/05 SA
RADIATION	Monthly bright sunshine (hours)	317.3	383.7	305.7	
	% possible bright sunshine	63.3	76.4	61.0	
	% normal bright sunshine	103.8	125.5		
	Bright Sunshine days	31	31	30.3	
	Monthly global radiation(MJ/m²)	646.8	733.0	633.5	
	Monthly diffuse radiation (MJ/m²)	228.1	170.4	216.5	
SOIL	Average temperature (°C) @ 9:00am grass level	27.4	28.1		
	10 cm/20 cm	14.0/13.7	16.7/16.9	18.0/18.9	
	50 cm/100cm	14.3/12.0	16.0/13.3	16.7/13.1	
	150 cm/300cm	10.1/7.2	11.3/7.9	10.9/7.5	

Saskatoon Stations

SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64

Normals

Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

July's average temperature was slightly above normal due to the above average minimum temperatures. On the 4th, the temperature reached 34.0°C breaking the 1996, 32.3°C record. Two days earlier, on the 2nd, the station had recorded the monthly minimum temperature of 7.7°C. It was not until the 21st did the temperature again rise to 30°C. Rainfall totalled above normal for the month due to 35.2mm received on the 18th and 19th. Precipitation accumulation for the year is now 86% of normal. On the 27th the station recorded a wind gust of 82.5km/h. Funnel clouds were observed north of Saskatoon. Winds leading up to this outburst were less than 20km/h. Every day enjoyed at least 3 hours of bright sunshine.

On July 5, 1937 Midale and Yellow Grass recorded Canada's highest temperature of 45.0°C. Other Saskatchewan places that set record temperatures on that date, which still stand, were Regina (43.9°C), Indian Head (42.8°C), Assiniboia (42.8°C) and Whitewood (41.1°C)[1]

[1] Environment Canada, MSC 2008a

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Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

August 2008

		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	26.1	22.7	24.6	
	Extreme monthly maximum (°C/date)	37.9/19	33.3/07	39.7/1998/06	39.7/1998/06 SRC
	Average monthly **minimum** (°C)	12.3	10.6	10.4	
	Extreme monthly minimum (°C/date)	4.6/23	4.7/24	-2.8/1976/28	-2.8/1901/23&1976/28 SM,SRC
	Monthly **average** (°C)	19.2	16.7	17.5	
	No. of Frost-free days (Temp. > 0°C)	31	31	30.8	
DEGREE-DAYS	Monthly growing (5°C base)	441.7	362.2	387.8	
	Yearly total-to-date growing	1423.5	1520.7	1403.0	
	Monthly heating (18°C base)	37.4	70.6	57.7	
	Yearly total-to-date heating	3500.4	3283.9	3496.4	
	Monthly cooling (18°C base)	76.1	29.8	42.5	
	Yearly total-to-date cooling	132.7	168.3	113.2	
PRECIPITATION	Monthly total (mm)	33.2	105.2	36.2	178.9/1954 NRC
	Yearly total-to-date (mm)	234.4	360.2	269.3	
	Greatest daily (mm/date)	17.2/26	48.2/17	33.8/1998/17	84.3/1945/03 SA
	Measurable precipitation days (≥ 0.2mm)	7	13	9.8	
WIND	Average monthly speed (km/h)	15.9	15.6	16.0	
	Peak gust (speed/direction/date)	56.9 NW 28	60.4 W 20		151 W 1967/14 SA
RADIATION	Monthly bright sunshine (hours)	310.7	242.4	280.8	
	% possible bright sunshine	68.8	53.5	62.1	
	% normal bright sunshine	110.6	86.3		
	Bright Sunshine days	29	30	30.1	
	Monthly global radiation(MJ/m²)	577.5	499.3	529.0	
	Monthly diffuse radiation (MJ/m²)	140.9*	182.7	185.6	
SOIL	Average temperature (°C) @ 9:00am — grass level	24.3	21.2		
	10 cm/20 cm	14.1/13.8	13.2/14.0	16.9/18.1	
	50 cm/100cm	15.4/13.4	15.1/13.8	16.8/14.1	
	150 cm/300cm	11.9/9.0	12.5/9.8	12.3/9.1	

Saskatoon Stations
SM= interrupted readings (NWMP) about 1892-1901
SA= S'toon Airport 1942-
NRC= Nat. Res. Council 1952-66
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

* Six days of missing data

For Your Information

August was generally warmer than average with near average rainfall. There were nine days with temperatures over 30°C. Daily maximum temperature records were set on the 19th and 25th when temperatures soared to 37.9°C and 36.3°C respectively. Recordable rainfall occurred on seven days totaling 3.0mm less than the normal of 36.2mm. The yearly precipitation total is now 87% of normal. Most of the rain occurred on August 13th when 9.2mm fell and on the 26th when 17.2mm was measured. The rainfall amount on these days also set new daily records. Bright sunshine was recorded on all but two days. By the end of the month Saskatoon had received 10% more bright sunshine than normal for August.

Hot temperatures produce extreme daytime heating causing moist air to rise fast. This encourages the formation of thunderheads and hail clouds. Edmonton, on August 4th, 1969, observed some of the largest hailstones ever seen in that area. The storm inflicted $17 million damage to the city. At Cedoux, SK on August 27, 1973, the largest documented hailstone in Canada was collected. It weighed 290g and measured 11.4cm across, larger and heavier than a standard softball. [1,2]

[1]Phillips 1990 [2]We Answers 2008

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Monthly Weather Summary

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CRS estab. 1963

September 2008		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	19.9	17.8	18.1	
	Extreme monthly maximum (°C/date)	29.3/18	29.9/04	35.6/1978/04	35.6/1978/04$_{SRC}$
	Average monthly **minimum** (°C)	5.4	5.2	4.9	
	Extreme monthly minimum (°C/date)	-2.3/26	-2.2/30	-7.8/1974/30	-11.1/1908/28$_{SE}$
	Monthly **average** (°C)	12.7	11.5	11.6	
	No.of Frost-free days (Temp. > 0°C)	28	28	25.6	
DEGREE-DAYS	Monthly growing (5°C base)	229.7	195.5	203.5	
	Yearly total-to-date growing	1652.6	1716.2	1606.5	
	Monthly heating (18°C base)	160.8	199.6	198.9	
	Yearly total-to-date heating	3660.9	3483.5	3695.3	
	Monthly cooling (18°C base)	0.5	5.1	5.8	
	Yearly total-to-date cooling	132.8	173.4	119.0	
PRECIPITATION	Monthly total (mm)	11.0	18.6	29.4	128.4/2006$_{SRC}$
	Yearly total-to-date (mm)	244.5	379.0	298.7	
	Greatest daily (mm/date)	4.6/06	5.6/23	52.4/2006/15	44.2/1931/12$_{US}$
	Measurable precipitation days (≥ 0.2mm)	7	13	8.4	
WIND	Average monthly speed (km/h)	13.8	13.4	17.0	
	Peak gust (speed/direction/date)	56.0^{WNW}28	60.0^{NW}26		148^{W}1967/22$_{SA}$
RADIATION	Monthly bright sunshine (hours)	259.6	209.0	186.0	
	% possible bright sunshine	68.9	55.1	49.1	
	% normal bright sunshine	139.6	112.4		
	Bright Sunshine days	29	27	27.0	
	Monthly global radiation(MJ/m^2)	402.2	355.6	351.8	
	Monthly diffuse radiation (MJ/m^2)	134.2	137.8	127.6	
SOIL	Average temperature (°C) @ 9:00am grass level	16.6	14.7		
	10 cm/20 cm	8.5/9.1	8.5/9.9	11.0/12.5	
	50 cm/100cm	11.9/11.9	11.8/12.0	13.2/12.4	
	150 cm/300cm	11.3/9.8	11.7/10.3	11.7/9.9	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Saskatoonians were spoilt this month with the beautful fall weather . The 2008 growing season officially ended at CRS on September 26th when the temperature dipped to -23°C. The frost-free season totalled 122 days; 5 days more than the normal of 117 days. Temperature averages for the monthly maximum and minimum were only 1.8°C and 0.5°C higher than normal respectively, despite temperatures soaring tothe mid-20s at mid-month. Precipitation was 62.6% below normal with the total for the year 18% below normal. An above rormal bright sunshine value of 39.6% translated into 73.6 bonus hours to finish the garden cleanup or harvesting. Winds generally were low throughout September with an extreme gust of 56 km/h from the west-northwest occurring on the 28th.

On September 8th, 1952 the newly created Canadian Broadcast Corporation (CBC) began broadcasting. The first person featured was Percy Saltzman with the national weather.[1]

[1] Phillips 1993

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Monthly Weather Summary

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CRS estab. 1963

	October 2008	2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	12.7	11.9	10.8	
	Extreme monthly maximum (°C/date)	27.9/02	22.4/24	28.5/1980/06&1984/08	32.2/1943/05 SAUS
	Average monthly **minimum** (°C)	0.5	0.4	-1.3	
	Extreme monthly minimum (°C/date)	-9.0/27	-9.2/27	-21.5/1991/29.30	-25.6/1919/26 SEUS
	Monthly **average** (°C)	6.6	6.2	4.8	
	No. of Frost-free days (Temp. > 0°C)	14	18	11.6	
DEGREE-DAYS	Monthly growing (5°C base)	83.4	61.7	63.7	
	Yearly total-to-date growing	1736.6	1777.9	1670.2	
	Monthly heating (18°C base)	353.5	366.4	410.2	
	Yearly total-to-date heating	4014.7	3849.9	4105.5	
	Monthly cooling (18°C base)	1.0	0.0	0.1	
	Yearly total-to-date cooling	134.2	173.4	119.1	
PRECIPITATION	Monthly total (mm)	47.0	12.2	16.4	69.8/1969 SRC
	Yearly total-to-date (mm)	292.4	391.2	315.1	
	Greatest daily (mm/date)	17.4/05	9.2/11	36.7/1984/16	41.7/1924/12&1969/03 SEUS
	Measurable precipitation days (≥ 0.2mm)	11	11	6.3	
WIND	Average monthly speed (km/h)	17.1	14.1	17.0	
	Peak gust (speed/direction/date)	75.0 NW 25	56.9 NW 25		138 NW 1967/16 SA
RADIATION	Monthly bright sunshine (hours)	199.4	190.8	157.9	
	% possible bright sunshine	60.8	57.9	48.0	
	% normal bright sunshine	126.3	120.8		
	Bright Sunshine days	28	28	27.0	
	Monthly global radiation(MJ/m²)	226.8	239.9	239.1	
	Monthly diffuse radiation (MJ/m²)	76.8	88.9	92.6	
SOIL	Average temperature (°C) @ 9:00am grass level	9.2	8.6		
	10 cm/20 cm	3.1/3.8	3.5/5.0	4.7/6.2	
	50 cm/100cm	7.5/9.3	7.5/9.1	8.3/9.2	
	150 cm/300cm	9.7/9.5	9.6/9.7	9.6/9.4	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Winter did not arrive in time for Hallowe'en this year. In fact, temperatures were above normal for that date as well as for most the month. Both the maximum and minimum monthly averages were almost 2°C above normal values. Although October had over 25% more bright sunshine than normal, it also experienced 47.0mm of rain, three times the expected precipitation. Rainfall, on the 5th, 8th and 14th, produced new daily records along with a total of 42.0mm or 90% of the monthly total. Harvest was interrupted until it could recommence in the latter half of the month when drier conditions prevailed.

Weather Lore indicates that a "Warm October" equals a "Cold February" or if "Flowers blooming late in autumn (as they did this year) indicate a bad winter . All is not pessimistic. Lore also says "As the weather in October, so will it be in the next March". ' So we may look forward to an early spring after a cold, hopefully late winter.

' Inwards 1893

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Monthly Weather Summary

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CRS estab. 1963

November 2008		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	2.8	-0.3	-1.4	
	Extreme monthly maximum (°C/date)	14.0/01	11.3/12	19.4/1975/04	21.7/1903/03$_{SE}$
	Average monthly **minimum** (°C)	-5.7	-8.9	-10.3	
	Extreme monthly minimum (°C/date)	-12.6/20	-24.9/26	-33.5/1985/24	-39.4/1893/30$_{SM}$
	Monthly **average** (°C)	-1.5	-4.6	-5.9	
	No.of Frost-free days (Temp. > 0°C)	3	1	1.2	
DEGREE-DAYS	Monthly growing (5°C base)	4.7	0.2	2.6	
	Yearly total-to-date growing	1741.3	1778.1	1672.8	
	Monthly heating (18°C base)	583.6	678.4	715.8	
	Yearly total-to-date heating	4598.3	4528.3	4821.3	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	134.2	173.4	119.1	
PRECIPITATION	Monthly total (mm)	6.4	14.5	14.8	57.3/1940$_{SE}$
	Yearly total-to-date (mm)	298.8	405.7	329.9	
	Greatest daily (mm/date)	2.8/03	5.8/18	19.3/1978/04	27.9/1938/01$_{US}$
	Measurable precipitation days (≥ 0.2mm)	9	12	7.9	
WIND	Average monthly speed (km/h)	14.7	16.4	16.0$_{SA}$	
	Peak gust (speed/direction/date)	60.3^{W}22	68.4^{WNW}13		100^{W}1976/17$_{SA}$
RADIATION	Monthly bright sunshine (hours)	96.5	107.6	98.0	
	% possible bright sunshine	36.6	40.7	37.2	
	% normal bright sunshine	98.5	109.8		
	Bright Sunshine days	25	21	22.2	
	Monthly global radiation(MJ/m^2)	98.6	117.5	123.7	
	Monthly diffuse radiation (MJ/m^2)	57.4	59.1	73.6	
SOIL	Average temperature (°C) @ 9:00am grass level	2.6	1.5		
	10 cm/20 cm	-1.0/0.1	-1.1/0.7	-1.7/-0.5	
	50 cm/100cm	3.2/5.9	3.2/5.8	3.0/5.6	
	150 cm/300cm	7.0/8.3	7.1/8.4	6.8/8.1	

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

On examining the climate record back to 1963 for CRS, this November was not the warmest on record even though the average temperatures were over 4°C above normal. The average monthly temperatures for this November were the 5th warmest maximum temperature (1987 = 5.5°C); the 7th warmest minimum temperature (1981 = -3.7°C) and the 6th warmest mean temperature (1981 = 0.3°C). Twenty-two days enjoyed temperatures above freezing. Snowfall was minimal throughout the month and by month's end only a trace was observed in shaded areas. Bright sunshine was slightly below normal with 12 days receiving less than one hour of bright sunshine. Winds over 51km/h (Near Gale) were observed on the 9th, 22nd and the 23rd.

With winter approaching, Canadian "Snowbirds" usually have either gone south to their winter homes or are preparing to do so. This November may have them reconsidering the necessity of an early departure as the average November temperatures were similar to what Dickinson, North Dakota, 550 km due south, expect at this time of year.[1]

[1] NWS Weather Forecast Office 2008

SaskPower Ministry of Energy and Resources
Saskatchewan Ministry of Agriculture
Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada
CAMPBELL SCIENTIFIC
Kipp & Zonen

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

December 2008

		2008 VALUE	2007 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-14.6	-10.9	-9.0	
	Extreme monthly maximum (°C/date)	6.0/01	-2.1/24	11.2/1997/14	14.4/1939/05 SE
	Average monthly **minimum** (°C)	-23.4	-17.7	-18.6	
	Extreme monthly minimum (°C/date)	-36.9/22	-26.8/08	-42.2/1973/31	-43.9/1892/22 SM
	Monthly **average** (°C)	-19.0	-14.3	-13.9	
	No. of Frost-free days (Temp. > 0°C)	0	0	0.2	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	0.0	0.1	
	Yearly total-to-date growing	1741.3	1778.1	1672.9	
	Monthly heating (18°C base)	1147.5	1001.2	987.7	
	Yearly total-to-date heating	5745.8	5529.5	5809.0	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	134.2	173.4	119.1	
PRECIPITATION	Monthly total (mm)	15.0	8.2	18.3	59.2/1956 SA
	Yearly total-to-date (mm)	313.8	413.9	348.2	
	Greatest daily (mm/date)	2.0/08	2.4/12	14.5/1973/23	28.4/1936/02 SE
	Measurable precipitation days (≥ 0.2mm)	18	11	11.4	
WIND	Average monthly speed (km/h)	13.5	12.2	16.0	
	Peak gust (speed/direction/date)	79.2 NW 02	47.3 NW 21		121 W 1955/12 SA
RADIATION	Monthly bright sunshine (hours)	85.9	85.0	85.4	
	% possible bright sunshine	35.5	35.1	35.2	
	% normal bright sunshine	100.6	99.5		
	Bright Sunshine days	23	23	22.8	
	Monthly global radiation(MJ/m²)	92.4	96.2	95.2	
	Monthly diffuse radiation (MJ/m²)	53.2	55.3	54.3	
SOIL	Average temperature (°C) @ 9:00am — grass level	-7.9	-1.3		
	10 cm/20 cm	-7.0/-4.7	-3.3/-1.4	-6.6/-5.6	
	50 cm/100cm	-2.3/2.3	-0.3/2.5	-1.7/2.0	
	150 cm/300cm	4.2/6.5	4.1/6.5	3.8/6.4	

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For Your Information

December began reasonably warm with temperatures above average but on the 13th temperatures plummeted to a low of -31.4 °C. Thus began a minimum temperature cold snap of -25°C and colder weather. It lasted well into the New Year with a brief relief on the 19th and 28th when the temperatures registered -24.3° and -22.1°C respectively. During these 17 arctic days, stoic Saskatoonians suffered through even colder days when the minimum temperatures fell beyond -30°C for eight days. A minimum temperature record was set on the 22nd when -36.7°C was recorded eclipsing -36.5°C (1983). Although the temperature was the main subject of discussion, snow fall was also a topic of conversation with 18 days seeing some snow wafting from the skies.

On December 23, 1884 Reginians huddled around fires as the minimum temperature of -48.3°C was observed, twice as cold as the maximum temperature of -24.2°C recorded this year on the 23rd. This frigid temperature still stands 125 years later as the coldest December temperature for Regina.[1,2]

[1] Heidorn 2008 [2] Environment Canada MSC 2008b

University of Saskatchewan · SaskPower Ministry of Energy and Resources · Saskatchewan Ministry of Agriculture · Campbell Scientific · Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada · Kipp & Zonen

INSTRUMENTS USED AT SASKATOON SRC CRS AND GLOSSARY OF TERMS

(Unless otherwise stated, source for definitions of terms is Environment Canada, 1978)

BEAUFORT WIND SCALE was developed by Admiral Sir Francis Beaufort in 1805 and adopted by the British Navy in 1838. It consisted of 13 degrees of wind strength, from calm to hurricane, based upon the effects of various wind strengths upon the amount of canvas carried by the fully rigged frigates of the period. Over the years it has been modified as needed and in 1946 the scale values (Force Numbers) were defined by ranges of wind speed as measured at a height of 10 meters above the surface. In effect, this transformed the 'Beaufort Wind Force Scale' into the 'Beaufort Wind Speed Scale'. This scale is the current standard scale for visual observations of the wind (Hudson, 1998).

BRIGHT SUNSHINE is the unobstructed direct radiation from the sun, as opposed to the shading of a location by clouds or by other atmospheric obstructions.

Number of Days is defined as the total number of days when at least 0.1 of an hour of bright sunshine was recorded.

Percentage Possible refers to the ratio of measured bright sunshine hours to the total possible daylight hours in a given period, expressed as a percentage.

Possible daylight hours are taken from the sunrise/set tables provided by the National Research Council of Canada, Herzberg Institute of Astrophysics, Victoria, BC.

Total is the sum of the daily bright sunshine values in hours and tenths of hours as measured by an automated sunshine recorder using voltaic cells.

DEGREE-DAY is an index for various temperature related calculations

Cooling (CDD) is the cooling requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of greater than 18°C is considered uncomfortable and supplementary cooling is required. On a specific day, the amount by which 18°C is less than the daily average temperature defines the number of cooling degree-days for that day.

Mathematically:

CDD = (T - 18°C), for that day, where T = daily mean temperature in °C if T is equal to or less than 18°C, CDD = 0.

Monthly and annual values of CDD are obtained by summing daily values.

Growing (GDD) is the growing requirement in order for plant growth to proceed. The air temperature must exceed a critical value appropriate to the plant species in question. For many members of the grass family, including most commercial cereals grown on the prairies, a base temperature of 5.0°C has been established. On a specified day, the difference between the daily average temperature and the 5.0°C base temperature defines the number of growing degree-days.

Mathematically:

GDD = (T - 5.0°C), for that day, where T = daily mean temperature in °C if T is equal to or less than 5.0°C, GDD = 0.

Daily GDD values are summed to provide totals for the appropriate month, growing season or year.

Heating (HDD) is the heating requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of less than 18°C is considered uncomfortable and supplementary heating is required. On a specific day, the amount by which 18°C exceeds the daily average temperature defines the number of heating degree-days for that day.

Mathematically:

HDD = (18°C - T), for that day, where T = daily mean temperature in °C if T is equal to or greater than 18°C, HDD = 0.

Monthly and annual values of HDD are obtained by summing daily values.

EXTREME is the highest or lowest value of a particular element recorded during the period in question.

EXTREME ALL YEARS Temporal comparisons at a point are also of value in some types of climatic studies. Therefore, it is desirable to produce the maximum length of reliable climatic record to carry out studies over a period of time. Data are drawn from the following data sets:

Saskatoon, SRC:1963 to present
Saskatoon, University of Saskatchewan:1916 to 1963
Saskatoon, City:1892 to present

Station locations, exposures and measurement procedures were subject to change during this time period. Data are not adjusted and users are cautioned accordingly.

FROST is recorded on each occasion when the daily minimum temperature is equal to or less than 0 °C.

NORMAL VALUE (1971-2000) In climatology it is often useful to make spatial comparisons of particular element values over a common time period. At an interior continental site such as Saskatoon, a period of 30 years is required to produce statistically stable estimates of the more variable elements. To facilitate spatial comparisons, the World Meteorological Organization recommends the standard normal (average) period of thirty years. The current normal period for data analysis at CRS is from January 1st, 1971 to December 31st, 2000. Data derived from CRS conform to this standard, except where noted. The normals for CRS have been calculated using the data collected during this standard period. Where gaps existed, data from the nearest climate station were used and referenced as to being used.

POTENTIAL EVAPOTRANSPIRATION (Thornthwaite Method) is the amount of water which will be lost from a surface completely covered with vegetation if there is sufficient water in the soil at all times for the use of the vegetation. It is computed by means of an empirical formula involving mean monthly temperature and average length of day.

Mathematically:

$PET = mT^a$ where PET = Potential of Evaportranspiration; m = % of day length for the month as compared to the year; T = Temperature °C when T is less than or equal to 0; otherwise T = 0; and a = yearly heat index. (Thornthwaite and Mather, 1955)

PRECIPITATION

Day is recorded on occasions when the amount of precipitation in a 24-hour period equals or exceeds 0.2 mm water. An asterisk (*) appearing in the average column denotes the occurrence of measurable precipitation on one or more occasions, and that the calculated 30-year average amounts to less than a trace. The so-called climatological day, beginning at 9 a.m. standard time on the date of reference and ending at 9 a.m. the next morning, was employed in record keeping up to January 1994. On February 1, 1994, after consultation with Environment Canada, record keeping was changed to the 24-hour period of 0000 hours - 2400 hours to conform to their reporting of climatological statistics.

Total is the sum of the daily recorded precipitation. The snowfall component of precipitation is recorded as an equivalent amount of liquid water. For particulars on precipitation measurement procedures and instruments, the reader is referred to the Environment Canada publication "*Manual of Climatological Observation's*", 2nd Ed., January, 1978. The notation "T" refers to a trace of precipitation (less than 0.2 mm water equivalent). As of August 7, 1993, total precipitation was measured using the Belfort weighing gauge for the winter season and the tipping bucket during frost-free period.

SEASONS Meteorologists prefer to divide the year into four 3-month periods based primarily on temperature. Thus winter is defined as December (previous), January, and February (DJF); spring as March, April and May (MAM); summer as June, July and August (JJA); and fall as September, October and November (SON). (Lutgens and Tarbuck, 1992)

SOIL TEMPERATURE under a short grass surface with normal snow accumulation, is measured according to procedures outlined in the Environment Canada publication "*Soil Temperature*" January 1, 1976. Depths below surface at which soil temperature measurements are made are: 5 cm, 10 cm, 20 cm, 50 cm, 100 cm, 150 cm and 300 cm. Since soil temperature is affected by profile structure and water content, extrapolation of the measured data is difficult.

SOLAR RADIATION

Diffuse - Total is radiation reaching the earth's surface after having been scattered from the direct solar beam. The instrument used is an Eppley pyranometer with a shade ring (See SOLAR RADIATION-Global- Total).

Global - Total is the sum of the direct solar and diffuse radiation during the period in question. Measurements are carried out on a horizontal surface near ground level and integrated over the whole celestial dome, summing the diffuse and direct components of the solar beam. The temperature-compensated Eppley pyranometer is used. The standard metric unit of measurement is the megajoule per square metre (MJ/m^2). (To facilitate comparison with past years' data: 1.0 MJ/m^2 = 23.895 langleys). Comparison is provided with a provisional average based on 16 years of data (1975-1990).

SPELLS - Temperature spells are defined as days when the daily maximum temperature is higher than or equal to 30°C (hot spell) or the daily minimum temperature is lower than or equal to -30°C (cold spell).

SUNRISE/SUNSET times have been included in this report. They have been acquired from the National Research Council, Canada, Herzberg Institute of Astrophysics.

TEMPERATURE

Average Annual is the average of the daily average temperatures in degrees Celsius (°C) for one year.

Average Daily is defined as the arithmetic mean of the daily maximum temperature in degrees Celsius (°C) and the daily minimum temperature in degrees Celsius (°C) for the day in question.

Average Maximum is the average of the daily maximum temperatures in degrees Celsius (°C) average over the appropriate time periods. For details concerning measurement procedures, the reader is referred to the Environment Canada publication, "*Manual of Climatological Observations*", 2nd Ed., January, 1978.

Average Minimum is the average of the daily minimum temperatures in degrees Celsius (°C) averaged over the appropriate time periods. Refer to TEMPERATURE-Average Maximum concerning measurement procedures.

Average Monthly is the average of the daily average temperatures in degrees Celsius (°C) for the month under consideration.

WIND CHILL describes a sensation, the way we feel as a result of the combined cooling effect of temperature and wind. This feeling can't be measured using an instrument, so a mathematical formula was developed in 1939 that related air temperature and wind speed to the cooling sensation. This formula was revised in 2001 by a team of scientists and medical experts from Canada and the U.S. with the Canadian Department of National Defence contributing human volunteers. The new index is based on the loss of heat from the face (Environment Canada 2004).

WAVES - Temperature waves are defined as a sequence of three or more days when the daily maxiumum minimum temperatures are higher lower than, or equal to, a set temperature. For a heat wave the temperature is 32°C. (Environment Canada 2005).

WIND SPEED

Average is the average of the hourly wind speeds for the period in question measured in kilometres per hour (km h). Average hourly wind speeds are obtained from a RM Young Wind Monitor anemometer at a height of 10 m.

Peak Gust refers to the highest instantaneous value recorded by the anemometer system for the period of reference, irrespective of direction and or duration. Comparison is with published data for Environment Canada, Saskatoon Airport station.

see also **Beaufort Wind Scale**

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